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WIDENER
HN QC9T U

A POPULAR HANDBOOK.

SIGHT AND HEARING,

HOW PRESERVED,

AND

HOW LOST.

BY J. HENRY CLARK, M. D.,

"Obsta Principiis."

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C. SCRIBNER, 377 & 379 BROADWAY.
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In the Clerk's Office of the District Court of the United States for the Southern District of New York.

W. H. TINSON, STEREOTYPER. GEO. RUSSELL & CO., PRINTERS.

To

HORACE F. CLARK, ESQ.,

In Remembrance of early and tender associations in the Home of our Childhood, and the reciprocations of later years,

This work is affectionately Inscribed

BY HIS BROTHER,

THE AUTHOR.

PREFATORY.

THE popular discussion of medical theories and methods of cure, in pamphlets and long conspicuous advertisements, does not tend to the real enlightenment of public opinion.

Pamphlets and books have been issued relating to diseases of the eye, the ear, the throat, the lungs, the spine, and the teeth; containing in effect no practical knowledge, serving the mere purpose of diverting popular attention towards their authors, or of introducing to public notice certain supporters, inhalers, etc., etc., etc.

The majority of books of every kind, however, are designed in some way to serve as an advertisement.

The healing art is too complicated for general appreciation, and is connected with too many collateral facts which must be first known, in order to the full comprehension of its essential truths. Though trite, it is on no other subject so eminently true, that "a little learning is a dangerous thing." A man may better be taught to become his own lawyer, because he deals in abstract truths. The physician, on the other hand, can only become truly competent by years of assiduous attention, and much accumulated experience. It is a life work. A recent English paper announces three eminent deaths as having occurred since its last issue—a professor, a distinguished physician, and a lord; and thus com-

ments: "The two first are of by far the greatest importance, because, while a lord can be made at any time, to become a competent professor or physician, is the work of a life."

A zeal amounting to enthusiasm, a knowledge of general principles, and a talent for observation, cultivated through a considerable period, are necessary to the full development of professional attainment.

The author does not seek to occupy a certain ill-defined middle position between the profession and the public; but this book is prepared with the full conviction that it fills an important place, and communicates truths which the public should know; the want of which is the cause of considerable suffering and loses the world much valuable service. The design of the work is to instruct the mother, the guardian, and the teacher, with regard to the dangers to which children and youth are exposed; to furnish hints to guide in the selection of trades; to advise the scholar when rest or change of employment is required; to point out methods which will tend to preserve the eye in its best condition to the latest period of life, and to induce the avoidance of those habits and practices which are calculated, in a great degree, to injure the important organs of sight and hearing. If it shall accomplish, to any degree, this useful purpose, the author will feel that his labor has not been spent in vain.

It has been his endeavor to frame the language of this book to popular apprehension; to make it suitable to be put into the hands of the parent, the governess, the apprentice, the mechanic, as well as of the student. At the same time, he has sought to embody facts, which will furnish to the scholar all that he may desire to know upon the subject, and has here indicated to the man of science where he may find more elaborate discussions, and more scientific and detailed illustrations, at original sources.

Although he trusts that his own experience has not been without its value, if this handbook has any practical importance, much will be due to the observation and experience of older and abler

observers. In its preparation, he has consulted freely, Tyrrell, Lawrence, Middlemore, Saunders, McKenzie, Cooper, Pilcher, Harvey, and Wilde, the most eminent British authorities, together with Sichel, of France, and Kramer, of Prussia.

An acknowledgment of indebtedness is due to two able magazine articles—one by Edward Reynolds, M. D., of Boston, in the Biblical Repository of 1853, and the other by George A. Bethune, M. D., in the Bibliotheca Sacra of April, 1855.

The author would not feel that these acknowledgments were complete, without the expression of obligation to his revered and lamented preceptor, the late James C. Bliss, M. D., of New York, for his early instructions in general principles; and especially to George Wilkes, M. D., his preceptor in this branch of the healing art, for his uniform kindness through many years, and for the many important practical truths, which his extensive learning, accomplished acquirements, and large experience, during his long connection with the New York Eye and Ear Infirmary, has enabled him to communicate.

J. H. C.

238 *Broad St., Newark, N. J.,*
April, 1856.

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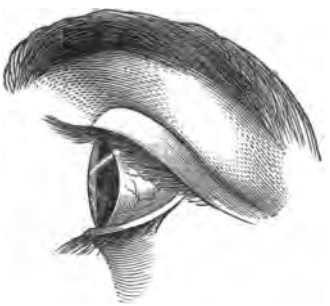


CHAPTER I.

CAPABILITIES AND MECHANISM.

"Within the small dimensions of a point
Muscle and nerve miraculously spun."

THE HUMAN EYE is the inlet of the soul, through which it finds expression, and by which the impression of surrounding objects is made upon it; enlarging its conceptions, exalting its aspirations, and extending constantly the boundaries of its knowledge. Its importance and value cannot be estimated, except by the import-

Its value.

ance and value of the time, labors, and accomplishments of the individual himself. Without it, man could accomplish little or nothing. Its loss has blighted the hopes, and blasted the prospects of many, and will probably so continue, despite the advance and success of scientific investigation. As a mere piece of mechanism, the world no where furnishes such a beautiful and complex piece of machinery in so small a space. It is an epitome of the whole human system. Almost every tissue of the body is here represented; muscle, ligament, gland, serous, mucous, and fatty tissues, bone, hair, follicles, nerves, blood-vessels and fluid; besides, it furnishes some wonderful examples of Divine Providence and Omniscience, of which no other part of the body affords an exact illustration. We have the mechanical power of the pulley, the retina, that mirror in the bottom of the eye upon which all external images are depicted, and that astonishing power of adjustment, by which the distinct image is formed upon it, whether it be six inches or six miles off; the colored pigment to absorb the superfluous rays, the sensitive iris, that beautiful curtain which raises and lowers, adapting itself to the light which is afforded; and when we

Its Mechanism.

add the cornea, which gives stability and strength to the organ, the vitreous humor with which it is filled; the external defences, the arched brow, crowned with that hairy ridge which prevents substances from rolling into it, and the lashes, which throw them off as they reach it, and the canal, by which the tears are conveyed away, after having performed their intelligent office-work of lubricating the eye; we shall perceive that all nature's laboratory has been exhausted, to produce this wonderful organ. In contemplation, who is not ready with the Psalmist to exclaim, "We are fearfully and wonderfully made."—But the great beauty of the eye consists in the soul that shines through it, the expression of that mind to which it holds office, that power of control, which, from the lower order of the animal creation up to the loftiest intellect, is exercised upon other animals or inferior minds, directing their actions, controlling their imaginations, and influencing their judgments. It is the great element of animal beauty. When disfigured or lustreless, we feel that that which constitutes the beautiful, is gone. It is a blessing so common, and its possession a boon so generally enjoyed, that, like other common mercies,

Its beauty.

it is seldom fully appreciated, till vision becomes defective or is lost.*

During certain periods of life, the eye generally retains its health, and is capable of the most vigorous exercise. It will bear even very great over-use and abuse. It will recover from the most frightful accidents. Wounds, blows, punctures, and injury of the nervous organism itself are borne with impunity; and the delicate and various functions of the organ are still again performed with their wonted regularity and precision.

Its endurance.

Passing the period of early childhood, and the diseases of the eye incident thereto, and the irruptive diseases peculiar to that and a later period, there succeeds, in most cases, twenty-five or thirty years in which the eye is capable of very great and continued exertion: to this rule, however, there are many exceptions which relate to constitutional peculiarities, habits, and occupations. At the close of this period, a

Its best years.

* For several illustrious and affecting examples of the influence of loss of sight, and, in spite of this infirmity, of great accomplishments, the reader is referred to the last chapter in the book, where will also be found a reference to the recent case of Professor Richardson, which has excited such universal sympathy.

large print begins to be comfortable, and if there is none of that flattening which betokens an absorption of the fluids of the body, and which indicates man's post-meridian, the eye manifests more or less intolerance of continued exertion; and, to the reflective mind, it becomes evident that before long there may come a limit to the exercise of its highest power.

It may be preserved.

This organ, so important to man in so many of his relations, may be protected, preserved, and the period of its usefulness greatly extended, by his own care and prudence; or its functions may become deranged or impaired, and the usefulness of the organ wholly lost by want of prudence and forethought. To indicate the manner in which this care shall be exercised, the dangers to which the eye is exposed, and the evils of certain improper practices, is my main object in preparing this work. Did I not hope to contribute materially to the accomplishment of this end, I should stop here at the threshold of my undertaking. I am fully persuaded that the world loses the services of many an able and excellent man, and that life is lost to himself, from the failure to protect his vision, which he would do, but for the want of competent advice. Men with

Selection of trades.

constitutionally feeble eyesight select trades or professions in which the visual faculties are called into constant exercise. Business of this nature having been entered upon, failure of the eyesight does not lead to its sufficiently prompt abandonment. There are many who can never educate their eyes to constant and unceasing use. With regard to the kind of light employed, there is need of the exercise of greater thought and intelligence. But with regard to the eye in health, during the best period of life, there is less need of caution than when suffering under disease. The healthy eye, if over-strained or over-taxed, will usually furnish some indication—will, in its peculiar manner, utter complaints, which, for his own comfort, the owner will heed. It is when weakened and diseased that by improper treatment, and oftener by improper remedies, it is permanently injured, and its future usefulness sometimes destroyed.

I propose to consider in what manner the eye can be most effectually preserved to the latest

General plan.

period of time, and to exhibit some of the modes by which the healthy eye becomes diseased; and also, the manner in which the improper management of the diseased organ

eventuates in its permanent injury and final loss. In the consideration of these topics, I shall endeavor to embody the experience of able writers, as well as the result of considerable personal observation. The discussion cannot fail to be interesting to every one who desires, in the highest degree, to accomplish the purposes of life, and perform the duties of his day and generation.

It is a wise provision of Providence that the functions of most organs, while in health, are performed without the necessity of care or attention on the part of the individual. The eye, however, is subject, more than any other organ, to man's control, and is peculiarly liable to abuse. In the native state, where the eye of man only met the carpet of green, and foliage of the same grateful color, when occupied with matters of general observation, when letters were not invented, when manufacture was in its rudest state, when men never engraved and women never stitched, and the eye was never taxed, as in a civilized condition of society, there was probably little demand for ophthalmic surgery. In this age of progress, of letters, and of multiform occupations, from the time that education is commenced

The native state.

to that period when active engagement ceases, earnest and practical people are ever taxing the eye to its utmost capabilities.

Habits of our people.

The American people, to a greater extent than any other nation, are an over-worked people. From the earliest period of immature development, up to the latest hour of possible exertion, as a people, we labor and think, and read and write unceasingly. To a large extent, we do not enjoy, like the Englishman, a social and protracted dinner season, during which the cares of the day are forgotten, and the mind rests from its labors; nor do we imitate the *bonhomie* of the Frenchman, who in his *café* sips his sugar and water, attends the theatre, or by various divertisements, manages to relieve the tedium and monotony of life's ordinary duties. The German, with more reflective habits and much patient industry, rests more, and in the enjoyment of his quiet and his pipe, dreams away some hours of every day; thus saving much of the friction which so wears upon the warp and woof of the life of our Yankee nation. With us, every day brings its duties, every hour its cares; even our pleasures must partake of the same excitement, haste, and

unrest. There is no community in which there are so few idlers. If our people travel, they would take passage in the fastest train, without regard to the dangers of the excursion; though at the end of the journey they had nothing to do but sit still, if even they found time for that. Few places present more evidence of life and activity, of bustle and labor, than our watering-places, when our pleasure-seekers are working hard to find enjoyment. The late hours and incessant activity of city life in the winter season, and the no less late hours, bad diet, and excitements of the watering-places, and the incessant toil of those classes not regarded "fashionable;" the determination to make use of every hour; the ambitious desire to gain wealth or place; and the almost universal custom among our poorer classes of keeping up an appearance of having more means than they enjoy—all conspire to make us an over-worked people. When that time arrives, if it is ever reached, when the ambition for wealth is sufficiently satisfied to retire, there are no tastes formed, nor reflective habits, without which retirement cannot become happy or useful.

Watering places.

Late hours.

Fashionable life.

The following felicitous passage occurs in the admirable speech of the Hon. Edward Everett, at the Webster Festival at the Revere House, in Boston, and is so exactly to the point that I quote. The orator, in referring to Mr. Webster's taste for manly sports, added these words:

"The Americans, as a people—at least the professional and mercantile classes—have too little considered the importance of healthful, generous recreation. They have not learned the lesson contained in the very word which teaches that the worn-out man is *re-created*, made over again, by the seasonable relaxation of the strained faculties. The Old World learned this lesson years ago, and found out (Herod I, 178) that as the bow always bent will at last break, so the man, for ever on the strain of thought and action, will at last go mad or break down. Thrown upon a new continent—eager to do the work of twenty centuries in two—the Anglo-American population has overworked and is daily overworking itself. From morning to night, from January to December, brain and hands, eyes and fingers, the powers of the body and the powers of the mind, are in spasmodic, merciless activity. There is no lack of

Importance of recreation.

a few tasteless and soulless dissipations which are called amusements, but noble, athletic sports, manly out-door exercises, are too little cultivated in town or country."

In all the employments that engage the attention, the eyes must perform an important part. Much of the labor falls upon this organ, and it sympathizes with the fatigue of the body produced by this incessant mental and physical activity. But God made the eye for use, and by its proper, legitimate, and even constant use, it is strengthened. Its functions are impaired only by its abuse—its use beyond the period of tolerance. The eye made for use. It is only by persistence in a course that common sense indicates to be mischievous, that ultimate evil is usually to be apprehended, and the usefulness of the organ impaired.

CHAPTER II.

THE STRUCTURE OF THE EYE.

"He kept him as the apple of his eye."

The eye may be regarded as an optical instrument, infinitely surpassing all human mechanism. The most ingenious philosophers and opticians have endeavored to imitate it, but without success. No single lens can be arranged so as to perform any such office or work as is accomplished by the eye. There have been furnished five learned and abstruse hypotheses to account for the manner in which the eye adapts itself to distances so suddenly and so perfectly; but it is admitted by all to be unexplained and unexplainable.*

To the professional reader, a description of the

* A learned work on this subject was published some years ago, by Dr. William Clay Wallace, of New York city.

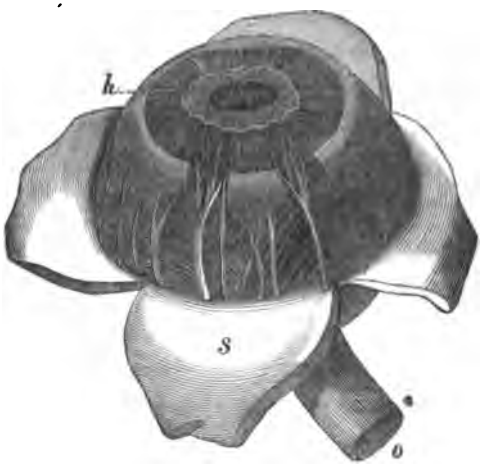
anatomy of the eye is unnecessary, and to the general reader, an extended detail would be uninteresting. I shall therefore say in brief all I have to say on the subject, illustrated by diagrams, which will enable the unprofessional reader to appreciate the allusions to the subject that may follow.

Its mechanism.

The eye is a round organ, situated in a certain cavity in the skull, prepared to receive it. Its form is preserved by coverings called Sclerotica and Cornea; the latter being transparent, and covering the anterior or conspicuous portion of the eye. The cornea may be compared to the crystal of a watch; while the posterior covering may be illustrated by reference to its case. These coverings being removed, where the sclerotic coat was taken off (or what is called the "white of the eye"), we find a deep brown membrane, which holds the blood-vessels, and furnishes on its inner surface the black pigment, which performs the same office for the eye, to some extent, that is accomplished by the black paint on the inner side of a camera-obscura. The cornea, which covers one-sixth of the globe, is hard and transparent, the first quality protecting the eye from injury, and the latter permitting the transmission of light. Just below the

cornea is the iris, through which is a round opening called the pupil, which admits light and gives color

Fig. II.



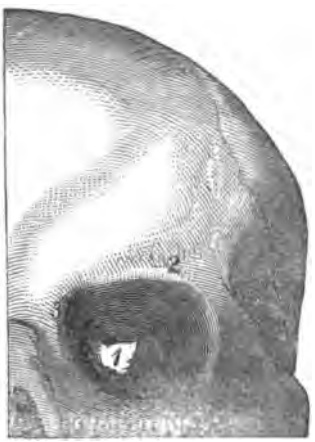
to the organ. Peeling off this coating, like the concentric layers of an onion, we let out a small quantity of clear water, which fills the space behind the cornea, and we find the crystalline lens filling up the whole space behind the iris. This looks like a double convex glass, such as that with which a small spy-glass is furnished. Peeling off the sclerotic coat, as in diagram No. II., is exposed the choroid with its black pigment. The rest of the ball is filled with a vitreous humor (a jelly-like sub-

stance), which occupies about four-fifths of it. Behind it, at the bottom of the globe, the optic nerve enters from the brain, expands, and furnishes the retina, the mirror upon which objects are depicted. Fully to explain the subject, would require a description of the glandular apparatuses; the tear-passages; and would involve the science of optics, which would be foreign to any present purpose. It is, however, an interesting subject, and should be thoroughly understood by any man who lays claim to intelligence.

In order to a better appreciation of what is to follow, I propose briefly to point out a few of the principal parts concerned in the structure of the eye.

I shall endeavor, as far as possible, to avoid scientific terms and anatomical details; but the careful reader would not be satisfied without some further insight into the structure of that organ, to which the succeeding pages relate.

The following illustration (Fig. III.) exhibits that cavity which God in his providence has prepared for the reception and preservation of this wonderful and essential piece of mechanism. It is situated at that point in the body best designed for active, prompt observation; and is providentially dupli-



cated, in order to assist the power of "adjustment," and provide against the contingency of accident. The receptacle is sufficiently large to preserve the eye from casualty, unless by a direct blow. It is surrounded, as the diagram referred to will illustrate, by a thick, bony, projecting margin, so arranged and so dense as still further to preserve the organ from the liability of accident. In view of this exhibition of divine sagacity, the exclamation of the Psalmist is peculiarly pertinent: "Keep me as the apple of thine eye."

At the bottom of this cavity, No. 1, will be observed an orifice, through which the optic nerve

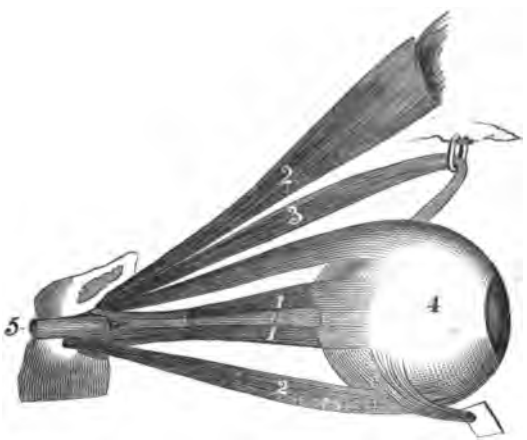
issues, to spread itself, and form that reflecting sur face at the bottom of the eye, upon which images are depicted.

Roughened places in the bone upon the sides of this cavity could be seen upon the skeleton, where those muscles find a holding place which serve to rotate the eye. Upon the margin of this organ is also observable the point of attachment of that intelligent little muscle, which, springing from the brow, passes down and spreads itself, and seizes the edge of the lid, just at the root of the lashes, and, like the drawstring of a curtain, pulls it up whenever the mandate is issued from the censorium above, whence the nervous power is derived.

On the same projection, about at the point indicated by Fig. 2, is seen also the spot where that remarkable pulley, yet to be described, is hung up; and on the inner side of the orbit, at the point indicated by Fig. 3, a receptacle for that sack which bottles up the tears, and passes them down through the canal to the nose.

In the next figure (Fig. IV.) is seen the eyeball, with the muscles, and optic nerve attached. In our juvenile books of natural philosophy, we are told of the discovery of the mechanical powers.

Fig. IV.



We see here an exhibition of three, at least: the lever—the wheel and axle, which is a modification of the lever—and the pulley. In order to roll the eye upwards, we have the upper recti or straight muscles, No. 1; in order to roll it down, we see the lower recti or straight muscles, also No. 1; in order to turn the eye obliquely, we have exhibited the oblique muscles, No. 2; and that the eye should lack no possible facility of motion, a species of mechanism is here introduced, which is found nowhere else in the human body.

An attachment to the upper part of the orbit is

arranged so that it answers the purpose of a pulley, through which the muscle No. 3 operates, so as to secure the eye greater facility of motion. Some of the muscles, as will be perceived, are cut away, in order to exhibit several muscles which would otherwise be concealed. No. 5 shows the optic nerve passing in to fill its important place as the nerve of specific sensation. Another class of nerves supply energy to the apparatus and appendages. No. 4 represents the eyeball.

If our wonder is excited by the sublime mechanism heretofore described, which had its origin in God, and its first illustration in the person of our earliest progenitor, it will be greatly heightened by a view of the interior structure, at which it falls within the province of this work merely to glance.

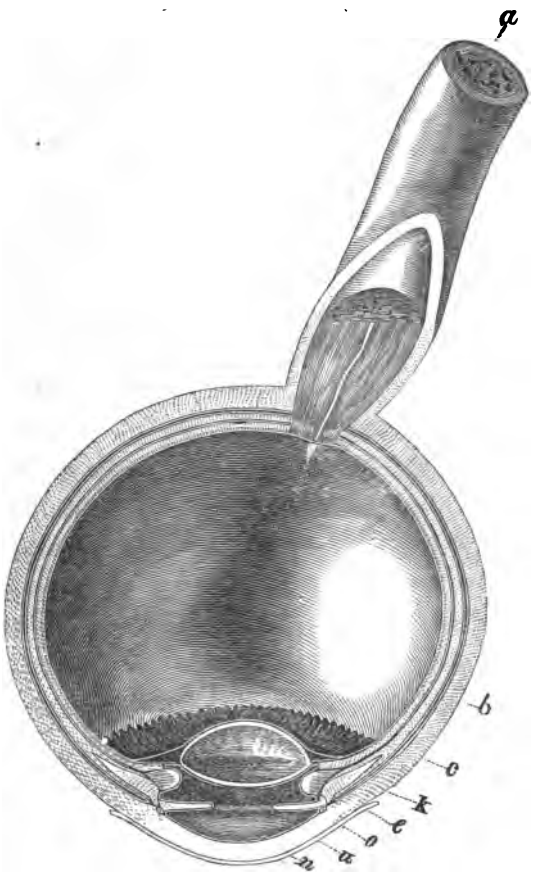
Figure V. exhibits the eyeball divided through in the centre, and is designed to convey some impression of the nature and office-work of several of its principal constituents. *b* is designed to exhibit the vitreous humor—a substance, with which the interior of the eyeball is mostly filled. *c* the ciliary body, and anterior limit of the retina. *k* marks the position of the crystalline lens, through which the light, in passing, is refracted as when passing through

a glass prism. *n* represents the cornea, which, as before said, is well illustrated by the crystal of a watch. The position of the iris and the pupil can be here observed at the points indicated by *u* and *o*. *e* marks the commencement of the sclerotic or muscular coat, which furnishes a strong case in which the organ is contained. *a*, at the extremity of the figure, shows the optic nerve again, which was seen in the foregoing diagrams. With the hope that these sketches and remarks will enable the reader to understand something more of the subject, and stimulate to further inquiry, we pass on to more practical matters.

The eye a cure for Atheism.

Sturmius held that the examination of the eye was a cure for Atheism. Paley runs a parallel between the eye and a telescope. He remarks that they are both instruments. The lenses of the telescope and the humors of the eye bear a complete resemblance to one another, in their figure, their position, and their power over the rays of light. The one is a perceiving organ, the other an unperceiving instrument. The one is made according to known laws of mechanism, the other is the work of an Almighty Architect, whose mechanism is too subtle for our discernment, or we

Fig. V.



find other than known laws of mechanics, which defy our powers of investigation. Says Paley,

Example.

"Observe a new-born child first lifting up its eyelids. What does the opening of the curtain discover? The anterior part of two pellucid globes, which, when they come to be examined, are found to be constructed upon strict optical principles; the self-same principles upon which we ourselves construct optical instruments. We find them perfect for the purpose of forming an image by refraction; composed of parts executing different offices; one part having fulfilled its office upon the pencil of light, delivering it over to the action of another part, that to a third, and so onward; the progressive action depending for its success upon the nicest and minutest adjustment of the parts concerned; yet, these parts, so in fact adjusted as to produce, not by a simple action or effect, but by a combination of actions and effects, the result which is ultimately wanted.

In considering vision as achieved by the means of an image formed at the bottom of the eye, we

Power of the eye.

can never reflect, without wonder, upon the smallness yet correctness of the picture, the subtlety of the touch, the fineness of the

lines. A landscape of five or six square leagues is brought into a space of half an inch diameter; yet the multitude of objects which it contains are all preserved, are all discriminated in their magnitudes, positions, figures, colors." In another place he says: "The exact resemblance of the eyes, considering how compounded this organ is in its structure, how various and how delicate are the shades of color with which the iris is tinged, how differently the eyes are set in different individuals, is a remarkable property. Of ten thousand eyes, it would not be probably possible to match one, except with its own fellow, or to distribute them into suitable pairs, by any other selection than that which obtains."

Dr. Paley.

The reader is referred to the work of Doctor Paley; though old, and, as a school-book, hackneyed, it affords many graphic illustrations which lead the mind to contemplate the varieties of that wise and beneficent superintending Providence, which furnishes to the contemplative mind so much that passes understanding, and bespeaks an Artist, master of his work; acquainted with his materials.

HOW THE EYE PERFORMS ITS FUNCTIONS.

With regard to the physiology of the organ, something must be said before proceeding further. A luminous body sends off a number of rays, which, while they pass through a medium of the same density, proceed in straight lines, but these lines are bent when they enter another medium. This will explain to some degree the manner in which the lines of light converge, so as to form the image upon the retina. This image, however, is formed bottom upwards; we place it upright again by habit merely. It is amusing and interesting to observe a child, in its first efforts to grasp objects, thus gradually gain the perception of their distance, and perhaps of their upright position. The ordinary forms of defective vision which produce long-sightedness and short-sightedness, are caused by the shape of the cornea or the lens. In the latter they diverge too quickly, and fall upon the retina, and require a concave glass to overcome the effect of this unnatural curvature. With regard to the extent of vision there is but lit-

Image in the eye, how formed.

Child's experience.

Extent of vision.

tle difference in persons of ordinary good sight. With regard to near objects, lines can be seen more readily than isolated objects. A line one forty-nine hundredth part of an inch, or half the size of the fibre of a silk-worm, may be seen with the naked eye. The faculty of descrying the object is more rare, and depends more upon habit. A balloon, a faint star, a flying bird, or a ship, can often be seen only when pointed out; while the captain of a vessel, for instance, will see it long before his passengers. This fact, as well as that the image is inverted on the retina, proves that vision depends much upon perception, instinctive or acquired. The association of touch is so gradually acquired, that we do not perceive it.

Power of vision.

Touch, a guide to vision.

A youth about twelve years old, who had been born blind, to whom sight had been communicated by operation, saw everything flat, as in a picture, and some time elapsed before he had acquired a power to appreciate the distances and forms of objects about him. An amusing anecdote is recorded of him, illustrative of this point. He knew very well the cat and dog by feeling, but he could not tell them

Anecdote illustrative of the assistance of touch.

by sight. One day he was observed to take the cat in his arms and feel her attentively, in order, evidently, to associate the sense of feeling and of sight; setting her down, he said, "So! puss, I shall know you another time." In another case, a lad having acquired sight by the same means, seemed rather puzzled by the new sense, and preferred finding his way round the house by touch; and only gradually perceived the increased facility which vision afforded him. The cause of single vision with the two eyes has given rise to much discussion, and is still not understood. In the new instrument called the stereoscope, by which daguerreotype and other pictures are seen with both eyes looking through a separate lens, the power of vision seems to be increased, besides the facility of looking around, partly behind the object; and it illustrates the wonderful facility of directing the vision of both eyes upon a single object. It appears certain—it may, however, be from habit—that both eyes serve to direct the vision, and that there is a separate image upon the retina of each eye, but the manner in which the two become a single image, cannot be explained. This will be

Stereoscope.

Both eyes; how used.

proved by the endeavor to place the end of the finger upon a small ink-spot, or to thread a needle, or snuff a candle, with one eye closed. Persons who have lost one eye require considerable time in order to obtain the appreciation of the distance of objects which they had before enjoyed. But this may be accounted for by the fact that an appreciation of distance is mainly attained from habit and association. There is no innate power in man of forming a correct view of size; thus the delusions produced by painters, or observable in a fog or haze. In view of these and other cognate facts and illustrations, an eminent writer says that "vision is, in fact, the art of seeing things that are invisible." There are many curious illustrations of the effect of persistence of impressions upon the retina. A card, having upon one side a bird, and on the other a cage, being rapidly revolved, the bird at length is seen in the cage, the impression of each image being retained upon the retina.

Delusions of vision.

Perfect vision requires that the fluids of the eye be perfectly clear, and that the impression upon the retina be distinct—also that the eye should form a perfectly dark chamber.

Certain diseased conditions of the body and mind produce aberrations of vision. Thus the hypochondriac is pursued by a man, a dog, or a skeleton, which he distinctly sees. The possibility of this may be appreciated when we consider the influence of the mind upon vision, and remember familiar forms and grotesque objects that sometimes appear to persons in health when about falling to sleep. The patient in delirium tremens sees plainly the bear, the monkey, and the serpent—*seldom any but black objects*—while otherwise he is sane.

Hypochondria.

Delirium Tremens.

He supposes his chamber to be haunted by cats and squirrels—imagines vermin to be crawling over his bed, and endeavors to pick them off—and sees persons of his acquaintance, many of whom he has not seen for years, apparently with great distinctness. The dyspeptic often sees fantastic figures about the time that he desires to sleep. A book-seller in Berlin was accompanied by figures moving about him night and day. He says, "I had become so very familiar with these phantasms that they did not afford me the least disagreeable emotion, but were subjects of amusement and mirth." During the operation of leech-

Spectral illusions.

ing for the removal of the difficulty, he remarks, "The room swarmed with human forms of every description, which crowded one on another till half past four, exactly the time when digestion commences." At length the figures moved more slowly, colors gradually became paler, at length they became white. At length they dissolved, so as to leave pieces or fragments of the figures, when they at length fully disappeared.

Supernatural appearances accounted for.

The disappearance and reappearance of objects, and the change of shape of inanimate objects, which are sometimes ascribed to supernatural causes, may be accounted for upon well-known principles. In a dark night, for example, we unexpectedly obtain a glimpse of an object in motion or at rest, and are anxious to examine it; our curiosity employs our full powers of vision. The retina is excited by the insufficient light, and is not able to afford a permanent vision of the object. While straining our eyes to discover its nature, it will disappear and reappear, and again disappear, alternately.

In another place allusion is made to false perceptions of color. A young lady, from disease, saw brilliant blues green; while the face of the person

with whom she was conversing, and a white handkerchief, appeared red. A case is related of an old gentleman, who saw all objects of a deep orange color, approaching to scarlet, just before lighting candles in the evening, and for an hour after waking in the morning.

Ocular spectra.

Curious anecdotes could be related in connection with ocular spectra. Ordinary manifestations of it may be familiarly illustrated thus: if we look for a short time at a window from the end of a long room, and suddenly close the eyes, and turn round from the window, we shall see an accurate representation of the sashes, the bars being dark, and the panes bright. Many have had a similar sensation after looking at the sun. Some persons are very susceptible of the phenomena of the colored spectra, and are thereby caused much trouble. One who had used his eyes too much by night study, was troubled during the early hours of rest by flashes of light, and in the morning, with reversed spectra of the objects in his dressing-room; whenever he turned his eyes to the walls of the room, he saw a black chair, which appeared white, or a framed print, which appeared black with a white edge.

There are many persons who have no power to distinguish colors. Some who have this defect are not aware of it; some do not admit it for fear of ridicule. An anecdote is told of a painter, who would persist in making his sky green, and his grass blue; while he really had otherwise great talent for his art. Some persons never can detect the difference in musical notes. An author thinks that one in twenty have some infirmity belonging to one of these classes. It is often hereditary.

Want of power to distinguish colors.

Anecdote.

Some persons cannot look continuously upon a red-lined book, or upon red-striped calico; and a case is related of an omnibus superintendent, whose account-book was red-lined, who was only relieved from much difficulty by making them blue.

Red-lined book.

Night blindness is a curious affection by which the person is unable to see even a lighted candle brought close to his eyes after nightfall. Lightning, great exhaustion from loss of blood or otherwise, or any cause that powerfully impresses the nervous system, will sometimes produce blindness. The Albino, one who lacks the coloring

Night blindness.

Albino.

pigment of the eye, has white hair and eyelashes, blue iris with whitish streaks, with an ability to face the light, and incessant movement of the eyes, furnishes, it is thought, only an example of the aggravation of that condition manifested by the want of power to distinguish colors; but I must not dwell here among the curiosities of my subject, but proceed, after merely referring to the subject of "snow blindness," first described by Xenophon. This is relieved by wearing some black thing before the eyes, or a gauze tissue to prevent the accession of light. From the Esquimaux and Greenlanders, who wear frames of wood before their eyes, the light being admitted through a narrow aperture; an apparatus, constructed of papier-maché and India-rubber, was prepared for the expedition of Sir John Franklin, and is beginning to be employed upon the deserts of Africa to a great extent.

Snow blindness.

CHAPTER III.

DISORDERS INCIDENT TO CHILDHOOD.

"A lovely being scarcely formed or moulded."

In order to render the subject plain and practical, and that it may be more readily appreciated by the ordinary reader, I shall refer first to those derangements to which the healthy eye is subject during the period of childhood and youth. Secondly, to the disorders and infirmities incident to middle life and old age; and lastly to what I regard of great practical importance: the popular mismanagement and abuse of the organ, when in a state of disease.

Infancy is a period of immature, imperfect development. On half the human race perish in our cities before their fifth, and in rural districts before their seventh year. In early infancy, hereditary taints and predispositions are

Infancy.

Hereditary tendencies.

most manifest. These years past, an immunity is enjoyed from these tendencies to a great extent; when at certain ages they re-appear.

The well-being of the infant is moreover influenced by a variety of circumstances; the health of the mother or nurse, opportunities of breathing a proper atmosphere, of being discreetly managed, and the avoidance of improper articles of diet. The infant should not be permitted to be obliged to look backwards over its head to see the nurse or mother; but should be encouraged to see only in the direct axis of vision.

Management of children.

Digestion.

The digestive organs are feeble, and unless they perfectly perform their duties, disease will surely occur. The shape of the stomach differs from that of later years—also its capacity. It requires to be often fed, and the food must be easy of assimilation. Many infants perish annually from improper feeding among the ignorant, and from pampering and indulgence among the wealthy. The deleterious character of cow's milk, and crowding the stomach, too early feeding with farinaceous food, furnish causes for numerous ail-

Improper feeding.

Cow's milk.

ments in children. *Good* cows'-milk, diluted according to the age of the child, *very little* sweetening with loaf-sugar, affords the best, and in most cases, the only proper artificial infant diet. As a general rule, arrowroot, farina, flour and bread, are entirely unsuited to very young children. I doubt not, but I see annually one hundred cases of diseased eyes, produced by improper feeding, and the use of sugar-candy. From the infant to the boarding-school miss, or the boy almost to his teens, I am persuaded that candy produces a most incalculable amount of mischief. I could fill many pages with illustrations drawn from my own experience, upon this subject. The exposure of new-born infants to strong light, whether solar or artificial, is often attended by deleterious results. The want of proper care in their cleansing, and the use of a sponge or napkin, not entirely clean, has been often productive of disease. It is a rule to be universally regarded in every kind and stage of diseases of the eye, that no napkin used by the patient should be used by any other person. This can never be done without risk, and has ever furnished a cause for the occurrence of much ophthalmic disease. It may be well to men-

Candy.

Management of new born children.

tion in passing that there is a severe disease liable to occur to infants about the morning of the third day after birth. If neglected, as it often is, or treated with some such useless application as a little of the mother's milk, the lids swell fearfully, and serious consequences often ensue. In such cases, the utmost cleanliness is necessary, and competent surgical advice should be promptly sought. Domestic dosing and the administration of medicine for every ailment is another prolific source of the diseases of childhood. Often, the first thing placed in the mouth of the new-born infant is a dose of medicine, as if God had made it wrong—made it to require medicine immediately upon its advent into this world. Afterwards every colic requires paregoric, or some other anodyne remedy, while catnip tea castor oil, senna tea, lavender, and peppermint fill up the intervals. I am persuaded that catnip tea is the most frequent cause of "sprue," and it is to me a standing wonder that so many children survive, and sometimes even thrive, despite all this dosing. I am inclined to think only the healthy do survive, as a general rule, while the feeble are destroyed.

Dosing.

Colic.

Catnip tea.

The management of children during the period of irruptive diseases, viz., measles, kine-pock, chicken-pock, and scarlet fever, also whooping cough—in all of which the eyes are more or less affected—has very much to do with their future well-being. A large number of the diseases of the eye in children, and most scrofulous diseases of childhood, date at the recovery from one of the irruptive diseases. Low diet, relief from strong light, and great care with regard to the use of the eyes during this period are of great importance. This time passed, and frequently before, the eyes suffer greatly from the child's being over-fed, and only a change in this particular will accomplish relief. Children too may be under-fed. Their blood may, by this means, become impoverished, when disease of a still worse character, and more unmanagable, frequently ensues. Children in health should be accustomed to considerable light, except in the cases of the newly-born; and after recovery from irruptive diseases, children should be kept in a well-lighted apartment. It is a bad practice to have the breakfast-room dark, but better to permit

Irruptive diseases.

Scarlet fever.

Over-feeding.

Under-feeding.

Light.

the eye to become gradually accustomed to the intense light of the noon-day. Like plants, children require the open air, and sunlight, in order to accomplish their fullest development, and to secure immunity from disease. No organ of the body so soon as the eyes, exhibits lack of attention to the precautions or the consequences above alluded to. The period of teething is critical in relation to the eyes. The eyes of healthy children, in consequence of this cause, together with over-feeding, often become diseased. If improperly managed, it results sometimes in permanent disorder of the organ. Children are very susceptible, and are severely affected by irritating causes that the adult would hardly perceive. Children of scrofulous tendencies suffer much more at this period of life from this cause; indeed, very few escape. Attention to the digestive organs is especially necessary, and often a reduction of diet in quality and quantity. These children should as much as possible be exposed to the out-door atmosphere; this cannot be too strongly insisted upon. Passing on a little later, when the child begins to read, it will often place the book very near the eye, and sit in a

Sunlight necessary.

Teething.

Out-door atmosphere.

bent position. In this way, the eye is enfeebled, and near sightedness may thereby even be induced. The tresses of little girls, if permitted to fall carelessly over the eyes, produce squinting; an unsightly and often irreparable condition. This deformity, I apprehend, usually occurs in consequence of the relaxed condition of that muscle charged with the duty of drawing the eye to the one side, or the disproportionate strength of the antagonist muscle which inclines it to the other side. Many children have a constitutional weakness, and require to be closely watched on this subject. Observe a group of little girls learning to draw, or reading together, and it will be seen that the slate or book almost touches their little cheeks; while they are continually throwing their curls from before their eyes. The most faulty habits of vision are in this manner, in some constitutions, undoubtedly acquired. Toy-books, and children's books should be printed in large type, and toys should be of considerable size: nothing which commands their close attention should be so small as to strain the organ. The child's bed should not, if possible, always occupy the same posi-

Bad habit of reading.

Near-sightedness.

Children's books too finely printed.

Position of bed.

tion with regard to the light; nor indeed should the nurse hold the child in such a manner as that the light should fall upon it always from the same direction. With regard to children constitutionally strong, all these minute injunctions are usually unnecessary; but they should be observed, and their attention enjoined on the parent. Often, these causes are observed to have produced distortion, derangement, or weakness, before any suspicion has been excited, or any care has been regarded necessary. The attention of children should be drawn to distant objects, when disposed to close application; they should be taught to hold their heads up, and full twelve inches distant from the book, the music-rack, or the worsted-frame, or whatever may be occupying their attention. The want of backs to music-stools, and their small size, tends to promote this habit, because it is necessary to lean forward to rest the back, and sit securely. Perhaps in no other position is a faulty habit oftener acquired. School-rooms should be light. Basements are unsuitable for this purpose. They are usually damp, and are situated too low to enjoy the most wholesome atmosphere. The

Position in study.

Music-stools.

Basements.

gases and exhalations that arise from the earth, because of their weight, lie nearest to it, and find their way most readily into these apartments; besides, the ceilings are usually low, and they are seldom sufficiently lighted. Unwholesome gases.

Squinting is characterized by one eye moving involuntarily and independently of the motions of the other, and turning away from its natural direction, when the person desires to fix both eyes upon the same object. If the sound eye is closed, a squinting eye assumes its proper position. The instant, however, that the sound eye is again opened, difficulty recurs. The squinting eye has imperfect vision. The cause is probably to be found in the brain and nervous apparatus; and not generally—as is supposed—in the muscles that rotate the organ. It often occurs as a symptom indicating certain diseased conditions. It is not easy always to determine which eye is faulty, and sometimes the difficulty relates to both. The operation of dividing the muscles for the cure of squinting is less popular than formerly, because not always successful. There are remedies which may be em- Squinting. Indications.

Remedy.

ployed, which require care and perseverance on the part of the physician and the parents of his patient, which will often prove successful. Squinting is seldom congenital; but it is often hereditary. Frequently three or four children are thus affected in a single family, taking it from the father or mother. It is said that usually, if the father or mother of a family squint, the majority of the family will have the same defect; but if taken from their parents while infants, they do not acquire the habit. It is, however, probably true that the child inherits the predisposition from the parents, for children first show a disposition to squint, at nearly the same age as the parents, or the uncle or aunt had done, and that several years after birth.

Not congenital.

Often hereditary.

Squinting is supposed by some to be caused, in many cases, by improper education of the eyes when young. They should be trained to regular and harmonious movement, exposed equally to the light, and objects should be presented, not too near nor too far from the eyes, nor in an unnatural direction. Laying the child in the cradle, so that

Causes.

Management of infants.

it sees objects with one eye only, holding the toy too near the eyes, or suddenly presenting close to the face some bright or attractive object, or inducing the child at the same moment to look at two objects. Children are said to have acquired squinting from the nurse, by imitation, or the trick of looking at their nose, or the habit of frequently attempting to examine some wart or excrescence upon the face. Injuries of the eye, or a slight disease, or even a stye, which should cause the child to look in an unnatural direction, may produce the disease. There seems to be in many children a strong predisposition to this derangement, and slight causes will operate to induce it. The custom of allowing the hair to fall carelessly about the eyes, of shading one eye, in case of disease (it is better, in all cases, to shade both eyes), and even extreme terror, or violent passion, or a severe fit of crying, has been known to produce it, or a whipping. Out of 200 cases reported,* the parents named the following as among the causes of disease: Imitation

Display of toys.

Acquire habit from nurse.

Looking at nose.

Shading the eyes.

* Dr. Radcliffe Hall.

Fear and passion.

of a squinting person, 39; from various diseases, 40;—among those, worms, teething, &c.;—from accidents, 8; watching the motions of a shuttle, 1; voluntarily trying to squint, or a habit of inspecting a scar or mole on the face, or looking at the thumb while sucking it, 10; holding the head sidewise while knitting, 3; looking at the sun, or a blazing fire, 5. Only four cases were regarded as congenital. The treatment for squint depends upon the cause, and consists mainly in contrivances designed to break up the habit before it becomes confirmed. There are cases in which the operation of dividing the muscle might be regarded measurably safe and proper, if every other means should fail. The principal reliance, however, is to be placed upon the management of the child, when the disease first manifests itself. "Obsta principiis"—which means *resist the beginnings*—is no less true in this disorder, than in others to which the eye is subject.

Looking sidewise.

Bright light.

How cured.

Children sometimes have congenital disease of the retina, or a weakness of the organs of adjustment; they do not see readily,

Some children diseased from birth.

and may be regarded stupid, because they blunder over their books or tasks. These children need encouragement—should not be overworked; their eyes should not be used to fatigue; they should be provided with books having large type, should be carefully watched, afforded plenty of light, and subjected to all the precautionary rules before-mentioned. Moreover, the eyes should be bathed in cold water, and, if possible, they should be placed in a small school under a patient teacher. It is very easy during the whole period of education, for young persons, and up to middle age, to bring the eyes to a condition of serious derangement. Of one hundred and twenty-seven students, in Oxford, thirty-two were observed to wear glasses. This necessity is even a lesser evil, and may be, and is often brought about by persistence in literary pursuits, without regard to the constitution, and the circumstances of the case.

Remedies.

Glasses.

CHAPTER IV.

DISORDERS INCIDENT TO YOUTH.

"Who, then, to power and glory shall restore
That which our evil rashness hath undone?"

When the student should stop his studies.

It seems hard to demand of the student, who has as yet ascended but midway the hill of science, to stop while he can possibly continue; but if his eyes fatigue, if he sees luminous objects, black specks, undulating light, rings and circles; or if his sight is misty, or his eyeballs ache habitually, if continued use inflame them; let him not resort to glasses, they will do him more harm than good. He is counselled to stop, to employ his eyes upon distant objects, to go into the country, or to journey, and when recovered, to return cautiously to his studies. Therefore, a change of duties

Change of habits necessary.

some manual labor interspersed with intellectual engagements, care with regard to diet, and the avoidance of the use of the eyes by artificial light, will often suffice to accomplish an entire cure. Colored glasses are bad; they render the eye over susceptible to the light, and are only temporarily useful. While the eyes are weak, a faint, neutral tint serves to protect the eye while exposed to the reflection of the sun upon the water, upon the snow, or upon the pavement during a noon-day. The question is constantly asked, "Shall I wear glasses?" even when the eye is suffering under the simplest form of inflammation. They are often resorted to without advice, greatly to the injury of the patient. It is very seldom that that they are useful under the age of thirty-five, and are not generally required till after the age of forty. Most young people boast of their eyesight, and feel that they are quite secure on that subject; not until they find themselves unable to employ them as beforetimes, will they be induced to believe that they shall ever suffer any derangement of vision. Thus the eyes receive very little care, until they begin to fail. And it is just here that the greatest evils

Colored glasses.

Glasses.

Importance of stopping labor when the eye is diseased.

are produced. Like a steam-engine which rapidly destroys itself after a crank, a wheel, or even a pivot is broken or lost; so the eye suffers rapid deterioration, if its use is persisted in, after the alarm is fairly sounded. Reference to its complicated structure and its many and various functions, and numerous analogies will cause this result to appear highly probable. If the scholar must quit his books, or the artisan his employment, if his eyes are likely to fail, the sooner he finds it out the better. Providence indicates that there is some other place in the world for him. There is something for every man to do. It is not necessary for all to be scholars, or jewellers, or stitchers, or engravers, or type-setters; many a man has persisted in some such employment, has groped his way though the world, attaining no excellence in his business; accomplishing for himself or others no desirable results. One that is learning the business of a jeweller, who is near-sighted, or has become so by application, had better desist; he will not improve. He may acquire distinction in some other employment, but

Rules.

Change in business or trade.

Jewellers.

that business he must leave to those who have stronger eyesight. This has been the turning-point with many men. Bent upon being a scholar, the path of science, difficult and rugged as it is to those who have good eyes, is to him insurmountable. He struggles on perhaps in his purblind career, until at length he is forced to give himself to new employments, for which he has had no education. The same talents and the same energy would have made him a good merchant, contractor, engineer, or farmer, and in these pursuits he would have accomplished higher ultimate success.

Triumph of genius over blindness.

There is nothing more interesting or remarkable than the manner in which genius has triumphed over blindness. After the mind was stored with rich and varied learning, vision has been lost by over-use or disease; and consequently the ability to read or write.

Still, under these circumstances, as is well known, some works have been written in our language which will live as long as the English tongue shall be spoken or read. But it is evident that youth, while in a position to select their employ-

ment, should take into consideration so important a defect as that of vision when early manifested. There are many persons who pass through life with imperfect sight, who, if engaged in such a manner that the eye was not closely employed, would never have had occasion to lament the slightest deficiency. The eye, which, while engaged in the observation of distant objects, indicates no imperfection, may not be able to direct its use to those more near, without evidence of exhaustion and injury. As before remarked, in the savage state, it is not likely that there is any derangement of these organs.

Occupations that most try the eyes.

Habitual daily employment for many hours in occupations requiring close attention, as in the business of the painter, seamstress, mantua-maker, milliner, weaver, tailor, shoemaker, printer, engraver, draftsman, book-keeper, jeweller, student, and literary man, is liable to be followed by inflammatory disease. This is especially apt to be the case when the unnatural excitement of the organ is unremitting and continued by artificial light, and is combined with want of exercise, full diet, and intoxicating drink. Light and air are seldom injurious to the

sound eye; but sometimes prove so to the diseased eye. A vivid flash of lightning, or any brilliant light applied in a sudden or excessive manner, may prove injurious. This has resulted from looking at an eclipse without a smoked glass, or with it, unless sufficiently opaque, or the observation has been too long continued. Working upon bright metals, or before strong reflectors, or in any other way exposing the eye to reflected light, is often hazardous. This is especially true when accompanied by heat, as in the business of the cook, baker, or iron-founder. Soldiers on long marches under a burning sun; travellers upon the sea or deserts, or over a surface covered with snow, are liable to suffer inflammation.

Lightning.

Looking at eclipse.

Cooks and travellers.

Inflammation of the eye is produced by a variety of causes, remote and exciting; many of which are not explainable upon any known principles of pathology. The body is powerfully modified by such circumstances as temperament age, individual constitution, mode of life as respects air, diet, clothing, exercise, sleep and other habits, season, climate, state of the weather and

Causes of inflammation.

atmosphere, and the unknown agencies which produce endemic or epidemic disease. Inflammation is usually attributed to a cold, and probably it is to be so attributed. But my judgment and experience lead me to regard colds as a consequence, and not a cause, and to look behind this accident to the predisposing cause which produced it. In sound health, exposure to wind and weather do good, not harm. Drafts of air, cold, heat, rain, and all kinds of atmospheric vicissitudes are borne with impunity at one time; while at another a little puff of easterly wind produces disease.

Colds.

As will be said hereafter, certain employments induce serious chronic ailments, but the same cause will also induce inflammation. Though meant to be used, and capable of much endurance, the use of the organ may be pushed beyond the degree of tolerance. Excessive exertion, on minute, and very bright objects, the use of the telescope, or of the microscope, may prove suddenly injurious.

Employments.

The incessant reading of double-column books for a long period of time, of diamond editions of the Bible, reading by imperfect light, in carriages or cars, or lying on the back

Reading in bed.

in bed, the too constant use of the magnifying glass, looking in one single direction without change of position, writing with pale ink, and reading, working or writing by gas-light, or strong reflected light, are all frequent causes of injury to these organs. With regard to reading in the cars, the author himself has some distressing experience. About four years ago, having occasion to ride in the cars upon a railway one whole day, he purchased of a boy a copy of a magazine, and perused it without intermission. On arriving at the end of the journey, the eye was blood-shot, as it is called, but still no inconvenience was experienced with regard to seeing. Having passed thirty seven years of life with the most perfect eyesight no particular care or anxiety was felt with regard to the result, and too little precaution was used, in view of their enfeebled condition. Still, never since that day have they recovered, nor has there been experienced a toleration of long-continued use. The present work has been prepared wholly by amanuensis, because of the necessity of saving the eyesight for the purpose of reading. The author fully believes that this and like causes have

Use of the magnifying glass.

Reading in the cars.

Author's experience.

produced in others the same results. The practice of incessant novel-reading, so common among our young people, is believed to result in serious injury to the sight. The power of vision is often thus bartered away for very small price, to very little purpose. Novels are printed usually upon very poor paper and in small type. The imagination is heated, the eyes are constantly riveted upon the page, curiosity is excited, and no attention is paid to position or to light; and thus this fruitless, profitless, pernicious habit, while it poisons the imagination, dissipates the mind, and wastes precious time; often deprives the reader of the opportunity for acquirements afterwards in a better direction, by leaving him with enfeebled eyesight.

Novel-reading.

CHAPTER V.

NEAR-SIGHTEDNESS.

"Misdirected youth, by sad experience found,
Ends in an age, imperfect and unsound."

Fig. VI.

THE ordinary printed page is most legible at a distance of from twelve to twenty inches. It cannot be distinctly seen without effort at a less distance than from six to eight inches. One who sees at a shorter distance than ten inches is considered near-sighted. The causes of this condition are an

Causes of near-sightedness.

unnatural and imperfect form, or some imperfection in the consistence or relation of the media through which the light is refracted, or it may arise from the loss of adjusting power, or it may be produced by overwork or other causes. The congenital form usually arises from too great convexity of the cornea, or the lens through which the light passes, or both.*

How produced.

The causes of congenital near-sightedness are attributed sometimes to too great convexity of the cornea, or its thickness, or the too great convexity of the crystalline lens, or the preternatural density of the transparent media of the eye, or the too great elongation of the eye-ball. The enlarged pupil is sometimes named as the cause, while it is probably the effect. The true cause is undoubtedly the first, as before stated. Persons frequently reach the age of 30 or 40 even,

* This will be more readily understood by reference to the diagram No. VII., Chap. X., exhibiting the effect of the lens; also the position of the crystalline lens which nature has placed in the eye for the purpose of directing the light upon the retina. Artificial lenses, set in spectacle frames, act on the same principle.

Moreover, let the reader compare the diagram at the head of this chapter, which represents the eye of the near-sighted person, with the natural eye, which is represented upon page 17, chap. I.

who have no idea that they are near-sighted, until they chance to look through the concave glass of some other individual, when they are surprised and delighted to find a clarity of vision that they have never before experienced. This usually excites in the mind a high degree of pleasure, and is really the acquirement of a new sense; for the subject can now see, with the assistance of the glass, objects more distinctly than he ever saw before. They have suspected that they could not see across the church or theatre, or street, as plainly as other people; but as they could read easily, they did not regard their case as one requiring any kind of glass.

How discovered.

It is a popular error that near-sighted eyes are by age rendered fitter for perceiving distant objects than they were in youth. Short-sightedness tends generally to increase rather than to diminish as age advances. Though well established that persons in old age become far-sighted, the analogy is false, which also expects a change in the near-sighted eye. Near-sightedness is more common in the higher than in the lower rank of life, and among those whose eyes are employed upon minute objects. Among the lower

Near-sight not improved by age.

classes, artificial means are seldom resorted to, and the increased exertion necessary to see frequently overcomes the difficulty. Among the higher classes, as soon as any defect is discovered, glasses are at once resorted to: influenced oftener by fashion than necessity. The use of concave glasses in a short time renders distant vision difficult if not impossible. "With regard to the proportion of near-sighted persons in the different ranks of society, Mr. Ware endeavored to obtain satisfactory information, by making inquiry in those places where a large number of individuals of nearly the same station are associated together. He inquired, for instance, of the surgeons of the three regiments of foot-guards, consisting of nearly 10,000 men; and he was informed that near-sightedness was nearly unknown amongst them, not six individuals having been discharged, nor six recruits rejected, on account of this imperfection, in the space of nearly 20 years. At the Military School at Chelsea, where there were 1,300 children, the complaint of near-sightedness had never been made among them, until Mr. Ware mentioned it, and then only

Effect of doing without glasses.

Why near-sight is more common in the upper classes.

Proportion of near-sight in different ranks of society.

Among soldiers.

At a Military School.

three were found who experienced the least inconvenience from it. He pursued his inquiries at several of the colleges in Oxford and Cambridge, and found near-sightedness very prevalent in these institutions. In one college in Oxford, where the society consisted of 127 members, 32 either wore spectacles or used hand-glasses. It is not improbable that some of these were induced to do so, solely because the practice was fashionable; but Mr. Ware believes the number of such to have been inconsiderable, compared with that of those whose sight received some small assistance from glasses, although this assistance could have been dispensed with without inconvenience, if the practice had not been introduced."*

At Oxford and Cambridge.

Though not congenital, near-sightedness is often connected with hereditary tendencies, which it is important to regard in the management of children thus disposed.

The want of care during the period of childhood, before alluded to, with regard to the light of the school-room, and the position of the little student, together with the manner of

Want of care in childhood.

* Mackenzie.

holding the book, &c., has a material bearing upon the future well-being of those who are born with this infirmity. If properly managed in early life, and no mistake is made with regard to the adoption of glasses, many persons pass through life, suffering very little practical inconvenience. By the aid of glasses, as good sight is afforded them, as that enjoyed by the naturally long-sighted.

Glasses.

It has frequently happened that one eye was near-sighted, while the other was in a healthy condition. Persons have been known to use one eye during a considerable period of their lives, supposing the other blind or imperfect, the labor all being thrown upon one eye. It has failed, or accident has revealed the fact that the supposed imperfect eye was near-sighted. Near-sighted persons see best in the dark, for it is natural to them to bring the object close to the eye, and they receive the full advantage of all the light, while others are obliged to close the lids and contract the pupils in order to see distinctly. A candle placed a yard or two from a short-sighted person appears dim and enlarged, and seems doubled, tripled and quadrupled.

Persons near-sighted in one eye.

Near-sighted persons see best in the dark.

Distant objects appear large to a near-sighted person, because the retina receives the rays beyond the point where they intersect each other. Near-sighted persons often write a small hand, because the apparent size of the letters is increased by their proximity. Looking through a pin-hole in a card, objects are more clearly distinguished, because the outer rays of light are excluded. To accomplish this purpose, near-sighted people are in the habit of half-closing the eyes when looking at distant objects; moreover the pressure of the lids upon the ball increases the adjusting power. There is often great difference in the two eyes, without the person being aware of it, until attention is called by some accidental circumstances. The right eye in all persons is apt to be the best. If both eyes are equal, a short-sighted person uses the right eye the most.

Near-sighted persons see best through a pin-hole.

This form of near-sightedness is developed at that period of life when it first becomes necessary to employ the eyesight. The disability may be greatly increased by the constant use of glasses at too early a period, and by overwork. A very common cause of evil consequence is the use of too high a power at the com-

Glasses.

mencement, and the too frequent change. Change requires further change, till a short-sighted person, like the victim of opium, constantly requires increased stimulus to produce the same effect; therefore change should not be often made. One-eye glasses are on many accounts bad; their use requires the employment of the highest power; moreover, the right eye being most used, its convexity is thereby increased, and the eyes are rendered unequal. Competent advice should be sought with regard to the adoption of glasses, because their improper use, as before intimated, often leads to serious results. Those glasses should be selected which will just suffice to see about fourteen inches. It is better to oblige the eye to accommodate itself to a power hardly sufficient rather than to increase it. The near-sighted student should avoid the use of the microscope, should stand at a high desk, write a large hand, and accustom the eye to see as far as possible. Etching, and the use of the magnifying glass, are improper for the near-sighted artisan. The two important questions with this class of persons, which may tell upon their future happiness and usefulness, relate first to the use of glasses, and next to the choice of

One-eye glasses.

employment. In selecting a business for a lad who is near-sighted, it is evidently improper to prefer one which requires the close application of his eyes. He may make a very useful man in some kinds of business; while in others he can never succeed. Choice of employment.

The medical man has seldom an opportunity of advising those in whom near-sightedness is not confirmed, to that course of treatment which might remove the incipient symptoms of this very serious imperfection of sight If true, that in the greater number of instances it is induced earlier or later in the nursery, in the engagements of childhood, or in reading, writing, sewing, engraving, miniature-painting, &c., the cure would probably be found frequently in avoiding the use of artificial assistance, and in engaging the eye upon distant objects. Exercise out doors, riding, walking, travelling, and seeking the invigoration of the general health, would often cure many cases in their very incipiency. Says Sir Charles Blagden, "Children born with eyes which are capable of adjusting themselves to the most distant objects, gradually lose that power soon after they begin to read and write; Incipient near-sightedness. Causes in childhood.

those who are most addicted to study become near-sighted more rapidly; and if no means are used to counteract the habit, their eyes at length lose irrecoverably this faculty of being brought to the adjustment for parallel rays. Of this I am myself an example," Sir Charles proceeds to remark. "When I first learned to read, at the usual age of four or five years, I could see most distinctly, across a wide church, the contents of a table on which the Lord's Prayer and the Belief were painted in suitable large letters." He furthermore remarks, that being much addicted to reading, at the age of nine, he could not see these letters at all, at the same distance. He refused to employ glasses, and suffered under the inconvenience of near-sightedness, until near thirty years of age. He then found that a moderate power sufficed for the next fifteen or twenty years. He says, "An earlier use of concave glasses would probably have made me more near-sighted, or would have brought on my present degree of myopia at an earlier period of life. If my friends had persuaded me to read and write with the book or paper always as far from my eyes as I could see, or if I had occasionally intermitted study, and

Sir Charles Blagden's experience.

taken to field sports, or any employment which would have obliged me to look much at distant objects, it is very probable that I might not have been near-sighted at all."

As near-sightedness may, to some extent, be regarded as a habit, it is probable that a methodical and persevering system, by which the eye should be directed to distant objects, would afford essential relief. An apparatus, or a sort of corrective desk has been invented for this purpose.* It is intended, by slow but steadily progressive increase of the distance at which vision is exercised, to increase its focal power.

Near-sightedness a habit.

Allusion has been made to the subject of glasses, but as this is a very important matter, more seems to be required in relation thereto.

Convex glasses were known in 1294, and their invention is attributed to Roger Bacon. It is supposed that the use of concave glasses to assist the near-sighted, followed soon after the use of the convex. They have been employed ever since, and have now attained a very considerable degree of perfection. As has been

Convex glasses

* By Professor Berthold.

said before, the near-sighted person should select the shallowest glass, or the lowest number which will answer his purpose. If, with the lowest number, he can discern the names on the corners of the streets, and it gives a decided outline to objects whose distance does not exceed about forty feet, he should not have recourse to No. 2. Objects should appear natural. If they have a glaring or dazzling appearance, or the eye feels strained or fatigued after looking through them, it is too deep, and a lower number should be selected. Double concave glasses, such as are required for near-sighted persons, are numbered one, two, three, &c. No. 1 being the lowest power, or shallowest concavity. Persons requiring glasses, if in a large town, should have recourse to a competent optician, and the surest plan is to try a series of glasses, until the proper one is discovered. The following rules are suggested to govern persons who may desire to write to town from the country, or prefer to be accurate with regard to the matter: If the near-sighted is desirous of assistance in seeing remote objects, *i. e.* beyond 200 or 300 yards, the focal distance of the glasses which he will require for that purpose, should be

Directions to the near-sighted to select glasses

the distance at which a small object appears distinct to his naked eye. For example, if he read this type at twelve inches distance, twelve inches will be the focus of the concave glasses which he will require for seeing distant objects distinctly.

If the glasses wanted are intended for reading with, or seeing near objects, let the near-sighted person multiply the distance at which he is able to read with ease with the naked eye, say four inches, by the distance at which he wishes to read, say twelve inches; divide the product, forty-eight, by the difference between the two, which in this instance is eight; the quotient, six, is the focal length in inches of the glass which is required."

Near-sightedness usually continues in about the same degree through the greater part of life; the same glass therefore will continue to afford precisely the same assistance, and it is a common, and often deplorable mistake, heedlessly to change for a deeper concavity. It is true, in the first using, that the next higher number would afford clearer vision; but in the long run, No. 1 or 2, about the earliest employed, will furnish the best sight frequently through a score and a half of years. Near-sighted

Near-sightedness does not change during life.

persons should not wear spectacles constantly; when worn for a considerable time, the patient does not see so well—but this is only temporary. A distinguished author * recommends persons who are extremely short-sighted, in order to prevent the necessity of stooping in writing, reading, music, &c., to use glasses with very shallow concaves, just sufficient to enable them to see the objects required, at the same distance with other persons. For distant objects he suggests the use of a small opera-glass, which, having an adjustible focus, is better than any single concave, because it can be exactly adjusted to the various distances.

Dr. Kitchener's suggestion.

ACQUIRED NEAR-SIGHTEDNESS.

Acquired near-sightedness is frequently produced by the close application of the eyes of persons who have found it necessary to resort to glasses on account of their age. The discovery of this impediment to progress, and the desire not to be hindered it in their work, induces the use of glasses of higher

* Dr. Kitchener.

power, which surely aggravates this morbid condition. At first, it is a mere habit, but little by little, the patient is obliged to bring objects nearer and nearer to his eyes. The progress of shortening is slow and almost imperceptible. Objects at length lose their distinctness. A mist appears to surround the objects of vision. This condition of things is brought about in the manner in which most cases of near-sightedness are produced.

Glasses.

Symptoms of near-sightedness coming on.

As has been before remarked, children, in consequence of the carelessness of their parents, contract the habit, which it is very easy to prevent by a little strict attention. Two cases have come under my observation recently of feeble little girls, whose vision was deranged by excessive study; the one had become short-sighted, and the other long-sighted: opposite conditions arising from the same cause and from the same management. Near-sighted people may considerably increase their focal distance by practice. Relief is afforded, and a cure frequently effected, by a cessation from labor, or its frequent interruption, removing objects gradually at a little greater distance, besides bathing the eyes in cold water, &c.

Remedy.

It is a form of acquired near-sightedness, that enables aged people sometimes to see without glasses, after having worn them for a considerable period; it is not susceptible of explanation. The newly-acquired power of vision is generally feeble, and the object requires to be held very closely to the eyes. There is a variety of acquired near-sightedness, which, unless properly treated, is followed by the most lamentable circumstances. It oftenest occurs in young persons between the ages of 12 and 18. It supervenes upon a condition of feeble vision, and is frequently caused by assiduous employment, and by placing objects too near the eyes. The patient perceives his sight shortening, and the use of the eyes produces fatigue and pain; and there is a sense of pressure upon the ball. There appears before his eyes a dark veil or cloud, and he is obliged to interrupt his employment, to look away from his work, and permit the sight gradually to return. He distinguishes objects at a distance less distinctly; and to look at them intently distresses him. This form of disease requires absolute cessation from labor, avoidance of glasses of every kind, and early application for

How old people throw off glasses.

Dangerous form of near-sightedness.

advice to a competent physician. This is always a serious disease, and, if not relieved, may result in the loss of useful vision. With regard to both forms of acquired short-sightedness alluded to, the use of glasses, so far from doing good, greatly aggravates the disorder. Their use seriously complicates the case, and renders treatment difficult, and the result doubtful.

Glasses.

That form of near-sightedness which is produced by close application to business, reading, writing, making microscopic observations, drawing plans, engraving or stitching—which is characterized by the appearance of black spots or motes before the eye, as well as a gradual shortening of sight—is essentially injured by the use of any kind of glasses. Change of business, country air and exercise, and a cultivation of the habit of looking at distant objects, is the only course to be pursued.

Near-sightedness an evidence of disease.

Short-sightedness is sometimes an evidence of disease, especially when it occurs suddenly in girls about 15 years of age. It has been known to be caused by worms. Short-sightedness is sometimes a symptom of cataract, and when it occurs after childhood, pro-

fessional advice should always be sought. Generally treatment or advice is necessary. Young men in France have been known frequently to produce near-sightedness by the use of glasses in order to prevent their being drawn into the army. The disease is unknown among savage nations, who lead a wandering life, and whose vision is only directed to distant objects. Many a man has been kept at the jewellers' bench without chance of recovery, becoming constantly worse, while, as a sailor or an agriculturist, he would have enjoyed high health, and perfect vision.

Near-sightedness unknown to savage nations.

Primitive long-sightedness is a general rule among civilized nations; and the power of long or short sight, depends in a very high degree upon the manner in which the eyes are employed. It is even said—though not with truth—that savages lose the power of discerning small objects, on account of their habits of inattention, except to those which are large and distant.

Seamen, hunters and travellers acquire very great power of long sight by habit, and farmers are very rarely short-sighted. When on the other hand necessity or inclination obliges the sight to be ex-

ercised assiduously upon small and near objects, the eyes accommodate themselves to these distances, and the sight becomes shortened. This often appears, as before said, at a very early age. Before the infant can walk, his very playthings oblige him, in order to see them distinctly, to observe closely. A little later at school, the small print, or the fine copy-book, forces him to incline his head forward, so that his eyes approximate the desk or book. At this early period, while the habits of adjustment of the eye are forming, it is only strange that by this plan of treatment there are not more short-sighted eyes produced; for notwithstanding, among the whole number, short-sightedness is comparatively rare. Nor has the child less favored by fortune, any better chance. He must learn to earn something by the use of his eyes, and at the earliest period is placed in apprenticeship, where his sight is fatigued by minute details: and by very weariness of the arms he is forced to bring objects yet nearer to his eyes. This course frequently ends in the loss of the faculty of accommodation to distant objects, and the boy becomes near-sighted.

Force of habit.

History of some cases.

In a manufacturing district examples are very

Case of a jeweller who became near-sighted.

frequent in which an inordinate desire to acquire wealth, or mistaken duty, induces men to sacrifice their eyesight. Two recent cases occur to me as furnishing illustrations. One of a man, who, from a boy, had eyesight to the highest degree of perfectness. He conceived the passion to become, if possible, rich. His trade is that of a jeweller. He denied himself the best food; he worked 16 or 18 hours in the 24, at chain-making; in the day-time in a basement, in the evening by the least expensive light that he could procure. He took no recreation, never *wasted* a penny upon the gratification of any desire but to become rich. He *succeeded*. He acquired all that he dreamed of, but now gropes about, still a young man, purblind, his compass of vision but a few feet, and his sight greatly enfeebled. How dearly has he "paid for the whistle."

A bad bargain.

He could have gained a competence and saved his eyes. If he had spent more in recreation, and been content not to have earned so much, he would have been worth a few thousands less and had good eyes still for twenty years.

A small heap of gold exchanged for the inestimable privilege of good sight! Could a worse

bargain be made? In an economic view, the time and money spent in rest, and the fee to a competent medical adviser, would have been the best investment that he could have made for his own good and that of his family. It is mistaken economy that induces the laboring man ever to abstain from seeking advice, even if it cost him a small part of the value of his services, during the time that they would be otherwise lost to his family.

Bad economy.

The other case to which I alluded, is that of a man who fancied that he must "keep the pot boiling," even if his eyes suffered. He did make a living for his family for a few years; then they sunk into miserable poverty. If he had earlier abandoned the endeavor, he might for years have contributed to their support and comfort, instead of becoming a poor, blind pauper, separated from his scattered family.

A hard case.

The resources of art have been made successfully to supply the want of adaptation between the refractive powers of the eyes, and the situation and form of the retina, which is the cause of this condition. By the aid of concave glasses, as beforesaid, near-sighted per-

Glasses.

sons are able to see as well as those who have no such infirmity. They render the parallel rays divergent, and divergent rays still more divergent; thereby causing the picture to be thrown upon the retina, instead of being before it; thus short-sighted persons are enabled to see distant objects.*

* For the illustration of this point, see diagram No. VII., Chapter X., on Glasses.

CHAPTER VI.

MIDDLE-AGED SIGHT.

* * * * His head
Unmellow'd, but his judgment ripe.

DURING the best period of life, with regard to eyesight, and the period of the greatest mental and physical activity, the eye is subject to various disorders and accidents; many of which are of an avoidable nature, which care and foresight might relieve. The development of hereditary tendencies, feebleness of constitution, the effects of disease, are among the remote causes, while overwork or accident usually furnish the exciting causes. Many persons inherit a scrofulous constitution, which so influences every organ of the body, as to debilitate it, and render it liable to give out, if severely used.

Causes of diseased eyes.

Hereditary tendencies.

Scrofulous constitutions.

This class suffer with regard to their eyes in childhood, during the period of teething; also from the eruptive diseases of early life; and in youth, from the first essay to use them diligently in the progress of education. In middle active life, the eyes of those subjects are most apt to suffer from overwork. The occurrence of this condition often changes their prospects and materially affects their happiness and prosperity. To early distinguish the coming on of this condition, and anticipate it by prudent measures, is a most material point, and will be carefully considered in the chapter on the subject of overwork.

Effects of failure of the eyesight.

Literary men are very apt to fall into the practice of using night for their labors, instead of day, because they are less liable to interruption at that period. According to the doctrine of Hufelin, this is a great mistake, and it is done at the expense of drawing heavily upon the material of life, and of permanently impairing its physical powers. It is undoubtedly an unwise course with regard to the eyesight, and affords very often a reason for its early failure. Many a one has spent

Why authors lose their eyesight.

Want of sleep.

the best years of his life in accumulating the facts and acquiring the habits of writing, in order to prepare a work, that should redound to his credit, and be useful to his generation; but, alas! when just fitted to perform the duty for which he had been preparing—by the failure of his eyesight he can accomplish it only by the slow work of amanuensis, or devote himself to other pursuits. Had he labored only by daylight, and during fewer hours continuously, he might have preserved his eyesight and accomplished the object of his ambition. The reason of this will appear when we come to consider the subject of light, and the influence of artificial light upon the conservation of eyesight. In considering that subject, it will moreover be apparent, that care enough is not exercised with regard to the quantity and quality of the artificial light usually employed.

Artificial light.

In our large cities, the construction of counting-rooms in the rear of warehouses, in such a manner, that the only light thrown upon the desk is reflected from the painted or whitewashed wall of a neighboring building, a few feet distant, and in a dark day, the necessity for the constant use of gas, furnish exciting

Faults in counting-rooms.

causes for the decay of eyesight, and are probably the cause of more mischief than would be ordinarily credited. Indeed, during the period of active seeing, all men are disposed to believe their facility in this particular, a life-gift, and are not easily persuaded, while they suffer no inconvenience, that there will be any limit to this enjoyment. The position of the desk in the office, the counting-room, or the clergyman's study, is a matter of importance, and often contributes to produce feebleness of vision. The clergyman or the book-keeper should, if possible, occasionally change his desk or place of writing, and the light should fall upon it somewhat from above. It should not be placed in a dark part of the room, nor should the light upon it be too intense.

Sight believed a life-gift.

Clergyman's study.

The situation of workshops upon the rear of lots in our large towns, with insufficient light, low ceilings, and cramped apartments, frequently furnishes causes for the early failure of the eyesight. Workshops should be large, the ceiling be high, and there should be no lack of light. The fumes of carbonic acid gas, distributed in an apartment, not only affect the health, but

Mechanics' shops.

have a direct influence upon the eyes. In jewellers' shops, where charcoal is much used, and in all workshops where this gas is eliminated, great care should be observed, in order to secure perfect ventilation. Man was made to breathe oxygen; of this, very few apartments furnish a sufficient supply for perfect health; of hydrogen, which is deleterious, and nitrogen, which is negative, it has enough. From childhood to age, exercise in the open outdoor atmosphere, or its free admission, is a necessary condition of healthfulness. The eyes, in common with the rest of the body, often suffer for the want of it. The gaslights employed in workshops consume so much oxygen, that if the supply is limited, there is less for the support of the workman whose time is there spent. An English writer says, "Among a large number of men who worked in capacious unventilated apartments lighted with gas, not one in seven had sound eyes." I think I have sufficient evidence to induce the belief that ophthalmias have increased in consequence of the introduction of gas into our dwellings.

Jewellers' shops.

Charcoal fumes.

Oxygen necessary for man.

Outdoor air.

Gaslights.

The arrangement of the light in churches, theatres, and assembly-rooms; the destruction of the oxygen in consequence of its consumption by the assembly, and by the numerous gas-lights, as well as by the necessity, in order to see the speaker, of facing a bright glaring light, are serious causes of derangement of the eyesight. Our public rooms should all have higher ceilings, be better ventilated, and the light so arranged that the eyes of the audience are not exposed to its glare. It would be very easy to shade the pulpit-lights, so that the speaker could have light upon his manuscript, and still his auditory be relieved from looking it directly in the face during the whole period of service. When more care is taken to make churches healthy places, in which to collect large congregations, to give them air to breathe as well as places to sit, glaring white walls, glass so stained as to tint objects with every hue contained in the rainbow, and gas-lights so placed as to glare naked in the eyes of the worshippers, will be among those things which have taken their places among the recollections of the past. The lights should be provided with globes of blue tint, the walls should be of a dark color, and

Lighting of churches and theatres.

Pulpit lights.

inside shades be provided for the long stained-glass windows. Churches are frequently made too dark and prison-like in the day-time; this is an evil thing to eyesight in another direction. Both may and should be avoided, for the class whose eyes are feeble and sensitive is very large, and new accessions are daily being made to it. None can be sure that a few weeks may not find them in that list. To all who are not untimely cut off there will surely come a time when "those that look out of the windows shall be darkened."

Churches too dark.

Sudden changes from darkness to bright light, and from the light to darkness, are undesirable and injurious. To avoid this, Eastern people anoint the lashes with a pigment made of antimony and oil; and Arctic voyagers, by contrivances, by means of which they look through a small aperture, prevent their eyes from receiving the full rays of light. It is a well-known fact (and there are many more facts which illustrate the same point), that at the time of the Bastile in France in 1787, the sight of prisoners was totally destroyed by being suddenly introduced to the blaze of a meridian sun. Galen says, that Dionysius the tyrant

Sudden changes.

Inhabitants of Northern regions.

Destruction of Bastile.

Dionysius the Tyrant.

of Syracuse used to bring prisoners from dark dungeons into a brilliantly-lighted room, the effect of which was to produce immediate blindness. The practice of keeping living rooms constantly dark, is bad. Light is a natural stimulus to the eye, and it requires it;

Light necessary.

and the reading in such light, of novels finely printed on bad paper, double-column books,

Diamond Bible.

and diamond Bibles, is a very pernicious practice.

The habitual use of intoxicating drinks, from

Intoxicating drinks.

the poor wretch who imbibes his miserable whisky to the "bon vivant" who luxuriates in his imported wines and high-priced brandies, produces ophthalmia now, as in the days when Solomon proposed the question, "Who have redness of eyes?" The recorded reply, "They that tarry long at the wine," is verified by the observation of every man who has taken any pains to observe. There are several forms of ophthalmia which spring directly from this cause, and which teetotalism only will cure. The opposite condition of things is, however, oftener

Living too poor.

a cause of derangement of vision. A very large number of cases of feeble sight are occa-

sioned by a debilitated condition of the system, and are relieved by bringing it up to par. Some cases of inflammation of the eye would be greatly aggravated by a glass of porter, and for others, not apparently very different, it would prove a valuable remedy. On this subject the ophthalmic surgeon is called upon to discriminate very carefully, and advise with much deliberation.

Nursing mothers.

Women over thirty, and who have had several children, and frequently those who have nursed them long, complain of feebleness and failure of eyesight. It becomes painful to employ them; motes and specks appear before the eyes, and there is frequently dimness of vision. This is more likely to occur, if, in addition to prolonged or undue lactation, there is superadded want of rest at night, and undue anxiety. This state of things calls for giving up nursing, and good medical advice.

Tobacco.

The incessant use of the cigar sometimes proves an exciting cause of irritation of the eye. It is occasioned by the smoke, and if there is no other cause, it is relieved by the substitution of the pipe. Tobacco,

Over-use.

however, produces other and graver

diseases of the eye than the mere injury produced by the smoke, mainly by its effect upon the nervous system generally, and directly upon the nervous structure of the eye. It is, however, the most popular plant in the world, and will probably so continue to be. If tobacco must be used, the form of the cigar is the most injurious of all others in which it is employed. The cigar, says an eminent chemist, especially if smoked to the end, discharges into the mouth everything that is produced by the combustion; and the more rapidly the leaf burns and the smoke is inhaled, the greater is the quantity of poisonous matter imbibed; and that finally, when the saliva is retained, the nervous system of the smoker receives the fullest effect of all the three narcotic ingredients which it contains. It may be thus accounted for that the end of the cigar is said to be in favor among inveterate smokers. The chewer and snuffer of tobacco escape this poisonous oil. From the manner in which the cigar is manufactured, it contains more of the poison than the tobacco in any other form. Tobacco contains a volatile alkali, and an empyreumatic oil. The volatile alkali is so poisonous, that a single drop will kill a dog or cat, and is

Cigars.

used by the Hottentots for killing snakes: a single drop being sufficient to produce instantaneous death. A quarter of an ounce of tobacco contains more than two grains of this poison. Professor Lazars, of Edinburgh,* proves by indisputable facts, some of which have come under his own observation, that excessive smoking produces the most direful consequences—"locally, by occasioning cancerous ulcerations about the mouth, and congestion of the brain, loss of memory, *amaurosis, generally confined to one eye*, apoplexy, palsy, and even mania. It produces disease of the heart, and often seriously affects the nervous system. Excessive smoking.

Says a celebrated writer,* in a very recent work, "I have already had occasion repeatedly to hint my suspicion, that one of the narcotico-acrids, which custom has foolishly introduced into common use, namely tobacco, is a frequent cause of amaurosis. A majority of the amaurotic patients, by whom I have been consulted, have been in the habit of chewing, and still oftener of smoking, tobacco in large quantities. It is difficult, of course, to prove that blindness is owing to any one particu-

* Dr. Wm. McKenzie, of Scotland.

lar cause, when, perhaps, several causes favorable to its production, have, for a length of time, been acting on the individual; and it is especially difficult to trace the operation of a poison, daily applied to the body, for years, in such quantities as to produce, at a time, only a very small amount of deleterious influence—the accumulative effect being at last merely the insensibility of a certain set of nervous organs. At the same time, we are familiar with the consequences of minute portions of other poisons, which are permitted to operate for a length of time on the constitution, such as alcohol, opium, lead, arsenic, mercury, etc.; and we can scarcely doubt that a poison so deleterious as tobacco must also produce its own peculiar injurious effects.

Essential oil of tobacco.

The essential oil of tobacco is so virulent a poison, that small animals are almost instantly killed, when wounded by a needle dipped in it, or when a few drops of it are let fall upon their tongue. Dr. Paris records the case of a child, whose death was occasioned by her having swallowed a portion of half-smoked tobacco, which was taken from the pipe of her father, and in which there no doubt existed a quantity of essential oil,

which had been separated by the act of smoking; for in the process of smoking, the oil is separated, and being rendered empyreumatic by heat, is thus applied to the fauces in its most active state. That the regular application, in this way, of a poison of such power, perhaps five or six times daily for months or years together, should at length be productive of serious effects on the nervous system, and especially on the brain, cannot surely be matter of wonder. Indeed, it would be surprising if it were otherwise.

Effect of tobacco upon various individuals.

Dr. Prout supposes some poisonous principle to be developed in certain individuals by tobacco. Hence their cachectic looks, and the dark, and often greenish yellow tint of their blood. He believes tobacco to disorder the assimilating functions in general, but particularly the assimilation of the saccharine principle. "It happens with tobacco," says he, "as with deleterious articles of diet; the strong and healthy suffer comparatively little, while the weak and predisposed to disease fall victims to its poisonous operation.

In estimating the bad effects of tobacco, the loss of saliva which the use of it, by chewing

and smoking, occasions, must be taken into account."

Disease directly produced.

This eminent author, who, if he has a peer, has no superior, in learning and experience, in relation to diseases of the eye, after detailing a case of amaurosis which was treated in his hospital at Glasgow, produced by tobacco in a person unaccustomed to its use, remarks, "Such is an instance of acute amaurosis from tobacco; chronic cases may be met with every day at any eye infirmary, generally in that stage in which there is reason to suppose the retina and optic nerve to be more or less in a state of atrophy.

One of the best proofs of tobacco being a cause of amaurosis is in the great improvement of vision —sometimes complete restoration—which ensues on giving up the use of this poison. A man having called on me, who was rapidly becoming blind, I explained to him that the cause was the smoking of tobacco, and seriously advised him to drop it. He returned some months after, in great spirits, so well that he was able to read. My advice had produced a deep impression on his mind; he had used no medicine, but had from that hour renounced tobacco, and came to thank

Effect of leaving it off.

me. Such a case is rare; so wedded are those who use tobacco to its indulgence, that it may literally be said that they would rather smoke than see. To attempt to cure by medical means the amaurosis of such persons, while they persist in subjecting themselves to the cause of the disease, is idle."

Mr. Widdifield of Boston, one of a venerable trio, who, with the senior Mr. Pike of New York, and Mr. McAllister of Philadelphia, for nearly a half century, have enjoyed deservedly high reputation as opticians—remarked to me a few days ago, that since the increase of foreign population in Boston within a few years, he had seen a much larger number of cases of amaurosis. He says, moreover, that of those who fell under his observation, many were Irish tailors, and, *without exception*, were addicted to smoking, and lived in small apartments, completely filled with tobacco-smoke, the very air being saturated with the perfume. The high temperature of the apartments, and the entire want of ventilation, probably contributes to this result.

Amaurosis—Irish tailors.

Tobacco smoke.

An interesting article has been recently pub-

Nicotine experiments.

lished on the habit of tobacco-smoking, and poisoning by nicotine. Among the facts there mentioned, are experiments instituted by M. Malapert, a pharmacien, of Poitiers. His intention was to ascertain the exact quantity of nicotine absorbed by smokers, in proportion to the weight of tobacco consumed.

The apparatus used consisted of a stone-jar, in which the tobacco was made to burn, connected with a series of bottles communicating by tubes. The bottles were either empty, or contained some water, mixed with a little sulphuric acid. From a few experiments, it was found that, in the smoke of tobacco extracted by inspiration, there is ten per cent. nicotine. Thus, a man who smokes a cigar of the weight of seventy grains, receives in his mouth seven grains of nicotine, mixed with a little watery vapor, tar, empyreumatic oil, &c. Although a large portion of this nicotine is rejected, both by the smoke puffed from the mouth, and by the saliva, a portion of it is, nevertheless, taken up by the vessels of the buccal and laryngeal mucous membrane, circulated with the blood, and acts upon the brain. With those unaccustomed to the use of tobacco, the nicotine, when in contact with the

latter organ, produces vertigo, nausea, headache, and somnolence; while habitual smokers are merely thrown into a state of excitement, similar to that produced by moderate quantities of wine or tea.

From further investigation it was found that the drier the tobacco, the less nicotine reaches the mouth. A very dry cigar, while burning, yields a very small amount of watery vapor; the smoke cools rapidly, and allows the condensation of the nicotine before it reaches the mouth. Hence it comes, that the first half of a cigar smokes more mildly than the second, in which a certain amount of condensed watery vapor and nicotine, freed by the first half, are deposited. The same remark applies to smoking tobacco in pipes; and if smokers were prudent, they would never consume but half a cigar or pipe, and throw away the other. Smoking through water, or with long tubes and small bowls, is also a precaution which should not be neglected.*

While quoting this paragraph, I have been called to lay down my pen and advise a young

* Froriep's Journal.

man, aged nineteen, who has palpitation of the heart, and other serious symptoms, for which he has been subjected to various treatment, and much medication. His is rapidly improving in consequence of following my advice, in abstaining wholly from the use of tobacco, which was the evident cause. He used the weed most inordinately. I am persuaded that there are peculiarities of constitution, and idiosyncrasies which forbid entirely the use of this weed. Persons of feeble constitution, of delicate stomach, or nervous susceptibilities, should avoid its use in any form. It is probable that the cases to which the learned professor alludes in his experience have occurred among this class of persons. It is certain that there is no form of nervous derangement, which, in some constitutions, it may not produce.

A case in point.

Although some German writers regard tobacco as unfavorably affecting the average of mortality among the young, it seems that a class of persons are not unfavorably affected, and that some are even benefited by its use. With some, it calms the mind, promotes digestion, and relieves plethora; but none should use it except in moderation, and in deciding upon its adoption, a

Some not injured by tobacco.

man should be quite certain that he is not of the class likely to be injured by its use or its continuance.

Facts like the above deserve consideration; if no better plea can be used in its defence than that it passes an idle hour, and supplies the care-worn and depressed with a gentle and soothing species of intoxication. Notwithstanding, from the earliest ages of antiquity, mankind have employed some stimulant to raise the drooping spirits, to enliven and cheer, to intoxicate and destroy. Tobacco was only introduced to the civilized world 360 years ago; still it has become universally popular. Though not food for man or beast, it is the most consumed of all vegetable productions; and, next to salt, the most used of all productions whatever, animal, vegetable, or mineral, on the face of the globe. It is partaken of by "saint, by savage, and by sage;" from the equator to the pole, and no nation has declined adopting it. It is grown, without difficulty, from the equator to the fiftieth degree of latitude. The produce of the world is estimated at two millions of tons annually. Philanthropists have pointed out from time to time the evils of its

Tobacco, universality of its use.

Extent of its cultivation.

use, but without effect; its consumption has constantly increased.

King James thus closed his celebrated temperance essay against its use in his day: "Have you not reason, then, to be ashamed, and to forbeare this filthie noveltie, so basely grounded, so foolishly received, and so grossly mistaken in the right use thereof? * * * * A custome loathesome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the blacke, stinking fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomlesse."

King James's counter blast.

The modern plan of building houses with the parlor windows to the floor, unless the light is partially subdued by the use of curtains, proves injurious by strong-reflected light being thrown in from the pavement, or a surface of snow. It is important that apartments should neither be too dark, nor again, too light; of two evils the latter is the least. The eye endures better direct, than reflected light.

Derangements of the digestive organs frequently produce disturbance of vision. They are, for the most part, however, tem-

Dyspepsia.

porary. Some confirmed dyspeptics, especially those who have reached the point of hypochondria, so called, are tormented with spectral illusions. Specs, motes, threads, scintillations of light, and unequal vision, frequently attend disorders of this class. These motes and specs have been observed by most people at some time in their lives.

Motes and specs.

Frequently the most serious organic diseases of the eye are resembled, and patients are sometimes treated for disease of the retina, when they merely require dieting. A case has just passed from my observation which presented most of the symptoms of amaurosis, one of the gravest maladies to which the eye can be subject. By obtaining control of the habits and diet of the patient, I have had the gratification to see her recover, without a single medical prescription. Most persons are aware that when they have eaten an indigestible article, which is distressing them, or they are said "to be bilious"—to use the popular term—the eyes frequently ache and are in a condition unfit for use. Though ordinarily this feeling soon passes away, it is easy to conceive that it would be likely to linger in some cases when the diseased

Amaurosis simulated.

condition was prolonged, and produce sometimes serious results.

How man wears out.

Man is somewhat like an old carriage, which will give out somewhere in process of time, and this disability is usually manifest in these parts which come into the most active use. If the eyes have been from childhood continuously employed, they will often, if abused, be among the first organs to fail.

EVIDENCE OF THE NATURAL FAILURE OF EYE-SIGHT.

With the first grey hair which betokens that the meridian of life is reached—that the hill is ascended—that soon the descent must begin—there is a slightly evident change in the visual faculties. That eye which for forty years has never failed to observe accurately, whether the distance were long or short; that organ upon which such entire dependence has been placed, has evidently seen its best days; and indications are furnished that its period of greatest activity will soon pass away. The conviction is usually unwelcome, and the evidence is frequently resisted most strenuously. Sometimes

the aid of glasses is refused, because it advertises the unwelcome fact, and injury is suffered on account of the neglect. There is an alteration in the refractive powers of the eyes, owing to a tendency in the cornea and the crystalline lens, to flatten; or the want of equilibrium in some portion of the visual apparatus. The exact change cannot be explained, but when we consider that the difference of an infinitesimal fraction of a line in any one of the numerous curved surfaces, or a slight difference in the density of the humors, would confuse the sight, we are filled with wonder, and while we admire the skill of Divine Providence, we cannot but be surprised that the absorption and change of middle life does not more seriously affect the sight. This equilibrium is not disturbed till the evening of life draws on, when the changes in the muscular and fatty appendages of the eye, undoubtedly contribute to its production.

Why the sight fails.

This period having arrived, at which constitutional changes occur, and which, however, reluctantly admitted, proclaim advancing age, it is observed that in order to read a fine print, the book or paper is removed farther from the eyes than has

been the custom heretofore. More light is necessary, and in looking at a near object the sight becomes confused; the letters run together and seem doubled, and there appears a sort of fog between the eye and the object observed. And furthermore, as facetiously observed by another, "By candle-light you catch yourself holding your book close behind the candle, and you begin to admire the ingenuity of that gentleman who invented snuffers." As life advances, there is a diminished activity in all the functions. Analagous to this is the loss, to some extent, of the adjusting power. The eye tires on looking at near objects. The organ, in a state of perfect indolent vision, is adapted to distant objects, and views them without effort or fatigue. The person who ordinarily read at twelve or fourteen inches is obliged to hold the book two feet, or further, perhaps; and the act of threading a needle, or reading a fine print, requires increased light, and is almost impossible. Persistence induces pain about the brows and forehead. This is the period of life at which cataract and other diseases manifest themselves. For this reason persons should be quite sure that their failing sight is

Symptoms.

Result of persistence in use.

owing to natural causes before they resort to glasses. If the sight fails from any cause, the general impression is that glasses are required, and will remedy the evil; they are therefore frequently resorted to unadvisedly. Glasses.

It is commonly at the age of about 45 that we discover that we see objects less perfectly, especially by artificial light. Reading small print, nibbing a pen, threading a needle, becomes somewhat difficult. Very minute objects become obscure, as if seen through a mist, or run into one another. The few who can read by candle-light, quite as well, after the age of 40, as they could before, will find that there is a degree of shortness in the sight of one or both eyes, which give them this advantage. One eye is frequently short-sighted, and the other possesses ordinary vision. Usually, persons who require glasses to see at short distances, see well at long distances without the aid of glasses, though this is not always the case.

This condition, instead of coming on gradually, as is usually the case, may occur suddenly. But this does not alter the case, unless it occurs during the earlier years of life, when it is a symptom of

serious disease, and calls for surgical advice, which should be sought for without loss of time. Providence has kindly ordered that this, the natural limit of man's active life, should be extended by the ingenuity of man, which has devised and perfected a remedy that admirably accomplishes this purpose. But there is a strong disinclination to admit the fact, and proclaim to our friends that it is reached, by adopting glasses. This is more especially the case among our female population. Says one, writing on this subject, "The sun of our animal existence has been wisely ordained to travel at so slow a rate that his progress is almost imperceptible, and so ardently do we love to bask in his rays, that when time whispers to us he has passed the meridian, we vainly endeavor to persuade ourselves that we have mistaken the point of his culmination." However, when the eye begins to fail, and we cannot see to read or write without discomfort, it is unwise and unreasonable to refrain from availing ourselves of so valuable a discovery. Age, affecting the alertness of youth, is no less unseemly than youth pretending to the sagacity of age. What others think about our age is far less important than the opportunity to employ our time, and

Unwise to refrain from glasses.

extend our usefulness. It is a popular notion that the use of glasses injures the eyes. This is undoubtedly true, unless those of a proper kind are employed, that is, those which afford just so much assistance to the eye as enables it to see without fatigue and *no more*. It is better that the power should be not quite sufficient, than a little too great. The belief that glasses must always be worn, if the habit is once commenced, induces many to refrain from their use. This is usually true; but it is better to submit with a good grace to an affliction which cannot be averted, and enjoy the hours of comfort and rational enjoyment, which, but for this appliance, must be lost.

Use the lowest power possible.

A medical gentleman in New York recently related to me a case which was regarded one of disease, in which a lady found herself unable to use her eyes without pain, or see without an indistinct vision, and the occurrence of motes, and specks, and flashes of light. Being directed to glasses of a suitable description, she was entirely relieved. She regarded herself as becoming blind. Literary people often become alarmed unnecessarily on account of derangements produced by the

neglect to employ glasses, when natural changes indicate their necessity.

ACCIDENTS.

Natural defences of the eye.

Notwithstanding that the situation of the eye is exposed, it is not as liable, as would be expected, to accident. Placed by nature in bony cavities prepared for their reception, sunken below the external surface, any missile of considerable size would strike the ridges of that cavity rather than the organ itself. It is moreover surrounded by natural defences. Upon the brow, which projects somewhat over the organ, there is placed a heavy growth of hair, which prevents perspirable matter from running into it; and the lids are fringed with delicate lashes, which are in perpetual motion, whisking away whatever foreign particles have fallen within their reach. If an offending particle passes these natural defences, or is driven forcibly into the eye, there is almost intuitively a considerable amount of fluid secreted instantly, which usually washes out the intruder; unless it has obtained a lodgment underneath the folds of

the lid, or has penetrated the ball. Sparks from a locomotive often become entangled beneath the folds of the lid, and require to be removed with care. Brass and iron-workers, especially turners and filers, are apt to get what is called "a fire in the eye." The employer, or the foreman in the shop, usually has some tact in removing them; but unless done readily, it is best to seek immediately surgical assistance. They cannot be allowed to remain, without danger of loss of time at least, if not of serious and protracted inflammation. Annually, for several years, I have been in the habit of having perhaps a hundred applications of this kind. A little tact, and a good deal of patience, will always accomplish the purpose.

Locomotive sparks.

Fire in the eye.

DANGER OF PERMITTING SUBSTANCES TO REMAIN IN THE EYE.

Says an eminent author from the journals of the Glasgow Eye Infirmary, "I could quote several lamentable cases, in which a conceited mechanic, having attempted

Danger of trying to remove metal from the eye.

with a common penknife, the removal of foreign substances from the cornea, violent inflammation followed, resulting in loss of vision."*

If the foreign body be an unignited foreign particle of iron, and is not removed, but is allowed to remain till it becomes oxydized, a permanent brown speck is produced, which afterwards produces a very serious defect of vision. Moreover, if not removed, but is left to come away of itself, a permanent white scar frequently remains, which is indelible. In some cases such substances find their way through the cornea into the anterior chamber, producing irreparable mischief.

Effect of metallic substances in the the eye.

Various substances inflame the eye by coming in contact with it, or, in popular language, "getting into the eye." Of this class are gases, and minute bodies of various descriptions, which float in the atmosphere; also dust, sand, or stone, as well as snuff, pepper, salt, and various chemicals which may be accidentally thrown into the eye.

Gases.

Foreign bodies.

With regard to the chemicals, there is more

* Mackenzie.

injury done by their intentional empirical use, than by accident. The eye will recover from injuries, which, considering its delicate structure, would ordinarily be regarded as surely fatal. I published in the journals, some years ago, an account of a case that came under my care, in which molten lead was thrown into the eye in such quantity as to furnish a mould of the cornea; still the secretion of the eye was so promptly thrown out, that the lead was rapidly cooled, and no injury ensued. There is on record a similar case which occurred some years ago in London. A medical friend in New York reported to me a case in which melted iron instead of lead was the offending material, and still no ultimate evil resulted. Punctures may be made into the eye, and injuries may be received, deranging its nervous organization, yet recovery may still be accomplished. In no case, however, can pain and inflammation be permitted to continue with impunity; surgical advice should be promptly sought. The eye is surrounded by fat. Blows, sometimes, though trifling, or the stings of bees or insects produce great unsightliness in consequence of the

Powers of the eye to recover itself from injury.

Cases in which melted lead was thrown into the eye.

blood being absorbed into this fat. These cases always present an appearance of being much more formidable than they really are. They usually recover without any injury to the eye. Those kinds of accidents cause much anxiety to young men who fear the reputation of having been engaged in some melee, or young ladies whose engagements call them into society. Time is the only remedy. This blood must be absorbed. The process cannot be much hastened by any remedy.

Bloodshot eyes.

ARTIFICIAL DISEASE AMONG SOLDIERS.

It may be well, in order to complete the subject, to state that soldiers have been frequently detected exciting inflammation of the eyes, by the introduction of foreign substances between the lids; their object being to secure a discharge or pension. Corrosive sublimate, snuff, the juice and ashes of tobacco, bits of woollen or cotton, an ointment of cantharides, lunar caustic, sulphate of copper, quick-lime, nitric acid, red precipitate, common salt, &c., have been known to be

Soldiers' self-infliction.

employed. In the year 1809, three hundred men in two English regiments were simultaneously affected with ophthalmia. The healthy were removed to another station, and every precaution was employed without success. Suspicion being aroused, the inmates of one ward were in the night suddenly driven into new accommodations, when their clothes and bedding being examined, small parcels of corrosive sublimate were discovered, with directions for its use, and another prescription to counteract its effects. The cause being discovered, and the supply of the article cut off, two hundred and fifty recovered in a very short time. In some cases handcuffs and tin masks have been employed to prevent this universal practice, when it occurs in a demoralized army.

Corrosive sublimate used to induce disease.

CHAPTER VII.

ARTIFICIAL LIGHT.

"Yon light is not daylight."

Direction of the light.

THE direction in which the light falls is of the highest importance with regard to seeing with comfort, and without injury to the organ. Light should not fall upon the object from several directions. It is better to be received from one only, and that above. A person reading should let the light fall over the shoulder, and not directly upon the eye. If not possible to do that, a shade should be employed. There is a very neat article of japanned tin which for some purposes better than those made of paper. Jewellers and other artisans, who sit in front of a light, should not neglect to have it properly shaded, so that the light falls upon the object,

Lamp-shades.

and the eye is not forced to meet it whenever the person looks up. The inner surface of the shade should not be glossy, and is better painted a light blue. Jewellers.

When the eyes are employed for a long time upon minute objects, highly illuminated by artificial light, the retina is very liable to become injured. The injury may be trifling and transient, if the exciting causes are at once removed; but, if continued, blindness may, and has often been known to follow. Continued use of the eye upon minute objects.

The eye was made for white light or daylight. The primary colors which combine to form daylight are yellow, red, and blue. Each of the seven prismatic colors possesses a degree of refrangibility peculiar to itself, and the undulations of "each are distinct as regards number, size, and velocity." Each color possesses a heat, also, peculiar to itself. Now, as artificial light possesses more red and yellow rays than daylight, it is more fatiguing and injurious to the eyes, because the "undulations of the red" being the fewest in number, the greatest in length, and attended with the largest amount of heat, most forcibly affect the retina. Indeed, Artificial light—reasons why injurious.

the heat of some kinds of artificial light, in close proximity to the head of the student or the artisan, is a source of evil. A feeble flame gives out more red light than an intense flame. An intense flame is better, therefore, not only on account of the amount of light, but the quality of that light. A light in which red and yellow rays prevail, excites the retina, but afterwards produces debility, such as follows the use of blue or green glasses.

Affections of the eye can be avoided.

Most of the affections of the eye could be avoided, with care. It is mere habit that prevents the mechanic from covering the glaring, naked flame before which he works. The eye receives the sunlight with pleasure, and without harm. In artificial light, blue rays are deficient. To remedy this evil, glass chimneys are sometimes used, tinged with blue. This greatly improves the light, and makes it more nearly like the clear, white, harmless light of day. The manager of a large establishment in England, provided the boys, who used the blow-pipe, with a pair of blue spectacles, and it is said to have relieved them from the weak eyes to which those engaged in that department were for-

Glass chimneys.

Blow-pipe—colored glasses.

merly subject. A similar plan has been suggested for the relief of the gold chain makers. I do not know that it was ever tried. There is an inviting field open here for the scientific philanthropist, which, if explored, and relief discovered for the evils of a purblind existence among a class of our manufacturing population, and for the poverty and helplessness of the old-aged, who are deprived of their eyesight—would make the discoverer a real benefactor of his race. In this country there is more intelligence among our workmen, and less indifference to inventions which secure immunity from disease. In Europe, every invention is apt to be regarded by the workman as an insidious design to lower wages; for example, the miner will be found at his work with an improved Davy lamp at one side, and a blazing candle at the other. Speak to him about it, and he will reply, "Their lamps ain't much good—yer jest as safe with 'em open."

Insensibility on the subject.

Another cause of the injurious effects of artificial light, is the direct and concentrated manner in which it acts on the eyes. The rays of light fall directly upon the engraving, for instance, which is employing the artist, or the

Artificial light too concentrated.

book, or sheet of paper; it is thence reflected into the eyes; the heat evolved irritating and inflaming the delicate coats and lining of the lids. The heat of the sun's rays is absorbed to a great extent, before it reaches the eyes, by reflections from the earth, the atmosphere, and the clouds.

Artificial light too divergent.

Another cause of the distress produced by artificial light upon the eyes, is, that the rays of light are diverged and not parallel; consequently the vision is indistinct, while the rays of the sun fall in parallel lines. The unsteadiness of artificial light is a serious evil to persons of weak eyes. Almost every description of common flame is unsteady and wavering. Who has not felt the relief afforded by the snuffing of a candle? Currents of air, and the nature of combustible materials must render it almost impossible to procure a perfectly even and steady light.

Artificial light unsteady.

Carbonic acid gas.

Carbonic acid gas is one of the chief products of combustion, and when in excess, produces drowsiness, difficult breathing, pain in the head, giddiness, and faintness. Carbonic acid gas is given out also in respiration; thus the distress occasioned to many persons of a

delicate, nervous susceptibility, by remaining in crowded, badly-ventilated, and brilliantly-lighted rooms. The effects upon the human system are most serious, impairing the health, principally through the medium of the brain and nervous system.

This gas has neither color nor smell, and a person may be exposed unconsciously to its baneful influence, and only be aware of its presence by its effects. The student, the mechanic, or the artist, who shuts himself up in a small apartment, having, perhaps, a low ceiling, illy-ventilated, with an anthracite coal-stove, a close fireboard, and a brilliant light, may shortly produce an atmosphere as deleterious as that in a crowded theatre at the close of the last act. This is probably an often overlooked cause of the failure of health and eyesight among those who perform much labor by artificial light.

Carbonic acid gas in small rooms.

It is the common product of respiration and combustion. A pound of oil when burned produces nearly three pounds of carbonic acid gas, and a pound of gas, two and a half pounds of acid. Every cubic foot of gas burned, produces rather more than a cubic foot of

Carbonic acid gas; how produced.

carbonic acid. It is evident, therefore, that if many persons are employed in a close room, where numerous lights are burning, the amount of carbonic acid gas produced cannot but be highly deleterious.

Dr. Arnot says, "that in respiration a man draws into his chest, at one time, about twenty cubic inches of air, and of that air a fifth part is oxygen; of which, again, there is converted into carbonic acid gas, nearly one-half. About fifteen inspirations are made in a minute, vitiating, therefore, three hundred cubic inches, or nearly one-sixth of a cubic foot of atmospheric air; but which, mixing as it escapes with several times as much pure air, renders unfit for respiration, under ordi- circumstances, at least two cubic feet of air per minute." It is calculated that the air, directly vitiated, amounts to eight hundred cubic feet per minute, and that it requires three cubic feet of air per minute to carry away the insensible perspiration of the skin. It will be necessary, therefore, in a room containing several persons, ordinarily lighted, to supply as many cubic feet of fresh air per minute as there are persons in the room. Carbonic acid gas is well

The want of ventilation.

known to be heavier than common air, and is supposed to be at the bottom of the apartment; but the carbonic acid gas of respiration is warmer than common air, and is combined with nitrogen and the vapor of water, both of which are lighter than common air; so that in that relation it rises to the ceiling, and is distributed through the apartment. If it finds exit at the ceiling, and purer air finds entrance nearer the floor, no evil ensues. But in the crowded, ill-ventilated apartments of the poor, no attention is given to the subject; the impure air is permitted to accumulate, and its serious effects are seen in multiform varieties.

Apoplexy, consumption, and that state of mind which leads to suicide, may be traceable to this cause. There are no class of artisans in this country who seem to pay so little regard to ventilation as tailors. There may be found perhaps a dozen in the winter season in a small room, with a low ceiling, sitting upon a board underneath a powerful camphene burner. It has no shade. It has a glass only because it will not burn without. The atmosphere of the room is stifling as you enter it from the fresh air. There is perceivable strong animal effluvia mingled with

Effects of carbonic acid gas.

the peculiar condition which is readily recognizable as the result of the excess of carbonic acid gas, and in its effects is almost suffocating.

Mechanics' shops.

From time immemorial, as every country boy knows, a tailor's and a shoemaker's shop were the hottest, and the blacksmith's shop the coldest in which he ever was forced to spend an hour. In the summer, behold the same group, the heat of the room being made twenty or thirty degrees higher than the heat outside, by the heat of their bodies and the irons. When night approaches, there is superadded all the other evils before enumerated.

Effect upon the habits.

Loss of appetite and general debility, impairment of vision, lowness of spirits, and the resort to stimulating drinks are the natural effect of this mode of life. Printing-offices and shoemakers' shops are open to the same objections. Tailors and printers suffer as much, probably, from the unfavorable condition in which they work, as from the unavoidable strain upon the eyes. Apartments lighted with common gas made from bituminous coal, or resin, should be ventilated with especial care. This light has an extreme tenacity of combustion. It will burn for

a long time in the most vitiated atmosphere, such as will extinguish oil-lamps and candles. There is, moreover, always more or less escape of unconsumed gas. The color of common gaslight is yellow, and to define minute objects, it is necessary to place them near the light. Professor Farraday has constructed an apparatus, by which the products of combustion are carried away, which results in obtaining a brighter light, a cooler space around the lamp, and prevents the vitiation of the atmosphere in the apartment. Several simpler plans have been devised, and eventually, when public attention shall have been more generally called to the subject, and is fully awake to its importance, some practical plan will be demanded, and when suggested, generally adopted.

Prof. Farraday's apparatus.

COMPARATIVE ADVANTAGE OF THE DIFFERENT LIGHTS IN USE.

Gas made by the combustion of bituminous coal or resin furnishes the light which is mostly used in our cities, and it is becoming every day more and more employed in private

Gas.

houses. Its impure color tries the eyes, but still it answers an effectual purpose, and furnishes about as good a light as any which is generally available.

Burners.

However, a large amount of heat and carbonic acid gas is evolved from it. Of the different variety of burners which are employed, those mostly used are the cockspur, in which the gas issues from a small hole; the batswing, in which it issues through a fine saw-cut; and the argand, the last, from which the gas issues in a circle from small jets, forming a tube of flame, and arranged for the application of a chimney. The last excels all others in brightness and steadiness of flame. A four-inch pipe will supply burners sufficient to equal the blaze of 2,000 mould candles. Camphene obtained from the distillation of turpentine, is objectionable on account of its very brilliancy. Doctor Ure says of one variety of camphene lamps, that "when burning with its utmost brilliancy, it emits a light equal to very nearly twelve wax or sperm candles of three or four to the pound." This brilliancy, and the cheapness of the light, makes it valuable for illu-

Camphene.

minating large apartments, but it is too stimulating a light for reading or writing. The ordinary gas, if properly managed, affords a good light. When surrounded by a shade, enamelled with white on the inner surface, too strong a light may be thrown upon the page or paper. The employment of a too brilliant light for the purpose of study, blunts the sensibility of the retina almost imperceptibly, and sudden impairment of the vision is the first symptom that awakens anxiety. Very strong light makes ordinary light insufficient, in the same way that too rapid increase in the power of spectacles annihilates the effect of the lower numbers.

Effect of a brilliant light.

With regard to burning-fluid and camphene, unless some way can be devised to render them safe, after the shocking casualties that have occurred in consequence of their use, no prudent family will employ them. Their inflammable quality alone, if there was no probability of explosion, makes them very dangerous substances to be used by ladies or children, who wear, for the most part, clothing of combustible materials. In order to get a safe artificial light, until something new shall be discovered, those

Burning fluid.

Oil and candles.

who have not the facilities of gas, must return to the less-cleanly oil and candles. With regard to the relative cheapness of these articles, Dr. Ure has given the following

Comparative expense.

table; the first being the cheapest, and the proportionate price gradually increasing:—

Whale oil burned in a hot-oil lamp,
Sperm oil in a carcel or mechanical lamp,
Sperm oil in a hot-oil lamp,
Common oil in a hot-oil lamp,
Mould tallow candles,
Stearic acid candles,
Spermaceti candles,
Wax candles.

Another author regards coal-gas the cheapest; next, vegetable oil; then, sperm oil; and afterwards stearin and wax. The light obtained by

Whale-oil,

burning oil is of a superior description, but much depends upon the construction of the lamp. Common lamps are open to several objections. The wick is not kept moistened with oil up to the verge of the flame,

Lamps.

and there is a strong tendency to thicken in cold weather. The carcel

lamp, so popular in Paris, by which the oil is raised through tubes by clock work, is free from the former of these objections. In the hot-oil lamp, there is a second tube at a small distance around the tube which contains the wick, and in the space between, the oil is contained: it there becomes warm, and descends though a valve to the wick, whilst the flame is modified by raising or lowering a glass chimney. The astral and the solar lamps secure very brilliant combustion and a perfectly clear flame, and afford, perhaps, the best kind of reading lamps. Forty-six rival lamps were exhibited at the Great Exhibition in 1851. In France, white stearic acid candles are used to a great degree. They are devoid of the glare and heating properties of gas. All candles are objectionable for the purposes of study, because they emit a light which is very inferior, flickering, and uncertain. If circumstances will admit, wax candles only should be used for this purpose. They are far less objectionable than any other kind of candles. There is a composition candle, made partly of stearin, which is very good and less expensive.

Mechanical lamp.

Hot-oil lamp.

Solar lamp.

Candles.

Wax candles.

Stearin candles.

Artificial light may be improved by surrounding it with a shade, colored blue on the inner surface. Blue rays mingle with the reddish yellow rays and produce a whiter light. Or a chimney, tinged with pale blue, to absorb the excess of red and yellow rays, may be applied to the lamp. Engravers are in the habit of employing a glass globe filled with water, which being interposed between them and the light, converges the rays and increases the illuminating power. A small quantity of sulphate of copper and ammonia would change the color to a delicate blue, thereby absorbing a portion of the red and yellow rays, render the light more pleasant, and application would be less liable to be injurious. When rays of artificial light are passed through a thin stratum of water, their heating power is diminished eighty-nine per cent.; thus this arrangement furnishes another important advantage. Rooms heated with hot air, should have somewhere in them a flat dish containing water, to relieve the atmosphere of its aridness. This is done on the continent. Persons engaged in work requiring strong light, will find an advantage in having one or two wet sponges

Shades.

Lamp chimneys.

A lamp shade suggested.

Rooms heated with hot air.

near them to cool and moisten the air. Silken shades suspended from the forehead, do not acccomplish the purpose of shading the light so well, because the eyes are kept too hot.

Wet sponges.

Blue spectacles are open to the same objection, in consequence of the rays of light absorbed by them, from their want of perfect transparency. This evil may be obviated by having two pairs, and using them alternately. As will be shown hereafter, colored glasses are open to other serious objections. A shade for lamp or candles should not have a glossy inner surface; they should protect the eyes from the flame. If a metallic shade is used, it is better to paint the inner surface a faint, dead blue. A properly-contrived shade affords great comfort to weak eyes. Shades of ground glass are adapted for general illumination, but not so well for reading.*

Blue glasses.

Lining of lamp-shades.

* E. V. Haughwout, 256 Broadway, will furnish a colored shade such as is suggested in this chapter.

CHAPTER VIII

OVERWORK.

"All day the vacant eye, without fatigue,
Strays o'er the heaven and earth; but long intent
On microscopic arts, its vigor fails."

ALL causes combined, which operate to the injury of the eyesight, are less injurious than the one placed at the head of this chapter. The taxing of the eye to perform most severe duty for a considerable period of time is the universal cause of the early decay of its functions. There are many, who, on account of a feeble constitution, hereditary tendencies, or a highly susceptible nervous system, cannot at certain periods of life oblige this organ to perform extraordinary duty without producing functional disturbance and ultimate feebleness; and if persisted in, irreparable injury.

Causes of failure of the eyesight.

This lamentable result is graphically described by an eminent sufferer, whose genius triumphed over the infirmity—which would have crushed an ordinary intellect—and enabled him to produce the poem which is pre-eminent, and will ever be admired, while our language is read or spoken.

Milton.

"Those eyes tho' clear,
To outward view, of blemish or of spot,
Bereft of sight, their seeming have forgot;
Nor to their idle orbs doth light appear
Of sun, or moon, or star, throughout the year,
Or man, or woman."—

Galileo shared with the great poet in the calamity of blindness from the same cause. His friend, Father Castelli, thus deplores the calamity: "The noblest eye which ever nature made is darkened—an eye so privileged, and gifted with such rare powers, that it may truly be said to have seen more than the eyes of all that are gone, and to have opened the eyes of all that are to come."—Although the disease which rendered Milton blind—technically called "amaurosis," was probably the result of overwork and a dyspeptic condition, still the worst

forms of this disease are dependent upon morbid conditions of the brain, and occur frequently among those who have no occasion closely to apply their eyes. It is, however, a result which may occur from inattention to early symptoms, and persistence in the use of the organ when diseased. The symptoms usually occur after some extraordinary effort, such as preparing a long manuscript, incessant reading in a fine print book, protracted application to some kind of manufacture; reading while lying in bed, or in the cars; but sometimes they come on insidiously or unexpectedly, and the person finds himself unable to use the eyes for a considerable period without intermission. If he persists in their use, pain is produced in the eyeball and over the brow, and strong light becomes painful. Furthermore the lids become diseased, and he is said to have weak eyes. This condition is described under several technical names. Without great imprudence, if there is cessation of labor, evil results are not usually to be apprehended. This is a disease that belongs eminently to civilized society. It would never occur in the native state, and is the result of overwork. It usually happens to those who work

General symptoms of injury from overwork.

by artificial light. Those most exposed to it are literary people, scriveners, book-keepers, engravers, jewellers, chainmakers, type-setters, watch-repairers, stitchers, lapidaries, saddlers, embroiderers, draftsmen, and artists. Its early symptoms should be well known, because the disease may be arrested or prevented by prompt attention to its earliest symptoms. It may be confounded with a more serious disease, "amaurosis," which is distinguished by a haze or net-work before the eye; threads, lines, or strings of globules seen moving in the air; lines of type appear confused and irregular, and there may be double vision. Sparks, flashes, or circles of fire are seen, especially at night, and a colored halo appears about the candle. The patient sees best in a strong light, and a dull pain is frequently felt in the head. These symptoms may be the result of overwork, but usually are not, and furnish evidence of the coming on of serious diseases, which requires more active treatment than mere rest.

Persons most liable to injury from overwork.

Symptoms of the coming on of more serious disease.

Most people have sometimes felt a peculiar feeling of irritation about the eye, after being exposed

Particular symptoms of injury from overwork.

to strong gas-lights in an ill-ventilated apartment; or when reading, or sewing, or working a long time, by gas or candle-light. This feeling is usually transient. Sometimes it is followed by the sensation as if sand were in the eye; and scalding tears issue from between the lids, and they are found in the morning glued together by a peculiar mucus secretion. These symptoms perhaps return upon the next occasion of close application of the eyes, and the organ becomes permanently and seriously inflamed. There is another form in which this disorder manifests itself, which is worse in its effects, though less offensive, as far as appearance is concerned. A student or a mechanic perceives a mist come over his eyes in the midst of his engagements. He rubs his eyes, and looks away from his work a moment,

Effects of persistence in labor.

and he sees again distinctly. Persisting in this course, the mist returns again, and small floating objects are seen in the air; he sees flashes of fire at night, and more of the symptoms described as those of "amaurosis," manifest themselves. This disease appears frequently among those who are forced to sew and stitch by artificial light, in order to sustain them-

selves and their families. If their eyes suffer, they cannot afford to stop, and not aware of the serious consequences of their course, they persist until useful vision is nearly lost. There is great difficulty in the treatment of these cases, because the principal remedy, rest, they are unable to afford. Without rest, no treatment, however skillful, can avail. A considerable change of habits, a sea voyage, if it can be afforded, and an entire suspension from ordinary engagements are very desirable. At least, all those pursuits which closely employ the eyesight, should for the time be abandoned, and entire recovery is an event ultimately to be expected. The rule in all these cases with regard to the use of the eyes is *to stop short of fatigue.* If after reading or working an hour, there is a feeling of discomfort about the eyes, labor should be intermitted: application of cold water, and a walk in the open air, will enable the eyes to recover themselves again. If, however, this does not occur, the eyes should cease to be actively employed, and means should be taken to invigorate the general health.

Inability to permit the eye to rest, on account of poverty.

Difficulties in the treatment of disease arising from overwork.

Rules for the patient under these circumstances.

As has been before suggested, in consequence of long-continued exertion by reading and writing, and after having spent a day reading in the rail-road-car, the author himself became the subject of this affection. He has found great relief in the course suggested. His practical experience of the disability occasioned, induces him earnestly to advise others to avoid the causes which led to such unpleasant consequences. All labor by artificial light should be avoided as well as visiting highly illuminated and badly ventilated apartments. Ladies, whose eyes are weak, should put away gaudy worsted works, avoid work on dark materials, and frequently change the objects of sight. One great evil in this country among our female population, and that which greatly embarrasses the physician, is the love of independence manifested among a class of society who refuse the condition of domestics, and are still unable to sustain themselves healthfully in any other employment. There are many seamstresses and milliners, who, if chambermaids, would avoid grave maladies of the eye. It seems to many more independent to work in a factory, or to make garments at six cents each by a

How pride interfores with cure.

Change of employments necessary to stitchers.

dim light in some garret, than to occupy the most favored position of domestic servitude. It is difficult to appreciate the reason why the service of the factor or the clothing-merchant should be preferred to the performance of household duties, which can be done more easily, and with more regard to comfort and healthfulness.

The factory preferred to domestic service.

There are a class of children whose nervous systems preponderate, who had better have no education, except what they can get incidentally during their childhood years. They need most physical development; mental culture they cannot receive to any great extent without loss of physical power. Their eyes or some other organ will exhibit evidence of suffering, if education is forced upon them. The world is filled with examples of the melancholy results of unthinking, indiscreet ambition on the part of parents who, having become proud of the precociousness or excellence of a "smart child," crowd him on disregarding unmistakable evidences of suffering and injury. Who has not heard of the prince who envied the boy that could play in the mud-bank—while he must be dressed up and remain within the palace-walls?

Children.

Effect of forced education.

Infant schools.

The mud-bank is better than the infant-school, outdoor air and dirty faces than tidiness and the over-heated nursery; misdirected thoughts better than mental discipline, at least for a large class of children. It has been well said that a child learns more, and has more to learn incidentally, before ten years of age, than all the years afterwards.

Short-sightedness the result of overwork.

Under the head of near-sightedness, it was remarked that this affection was often produced by overwork. This condition, without care, often becomes permanent. Persons whose eyes are in the irritable condition before described, should avoid fishing excursions upon the water, or exposure, for a considerable period, when the ground is covered with snow. If such exposures are necessary, slightly colored glasses should be employed, only during the period of the exposure. To use them habitually would be an evil. If colored glasses should be employed, it is important to have them lightly shaded. After taking them off, the eyes should be closed for a moment, lest they suffer from the too sudden accession of light. The darker shades are liable to heat the

Colored glasses.

eyes, and this will be in proportion to their density. The colored glasses are necessary when the eye cannot bear the excitement of light, and in cases of the earliest stages of cataract they serve to modify the light. Glasses of the smallest possible magnifying power sometimes serve to relieve the eye, in that enfeebled condition which is caused by overwork, by aiding the adjusting power, but should not be resorted to without advice.

Glasses.

Literary men suffer oftener than any other class, from all the symptoms heretofore attributed to overwork. This is especially true of students; because, in order to pursue their labors, the eyes must be perpetually employed. There is no class of diseases more common, therefore, in our literary institutions, and which oftener interrupts the literary career. It is sometimes attributed to the form of the Greek and Hebrew letters; because, students pursuing these studies are often the subjects of attack. But the real cause is to be found in feeble constitutions, over-labor, too much mental excitement, and too little exercise of body.

Students.

Form of Greek letters.

It is of great importance that this class of per-

sons should appreciate the manner in which the eyes may be protected, and their use extended, especially in the age in which we live. As steam has added greatly to the effectiveness of all mechanical powers and to the productiveness of industry, so the art of printing has considerably increased the value of this organ. The mental treasures of ages have been gathered together, and so concentrated by means of text-books, and cyclopædias, that the inquirer of to-day has a very long start of him who pursued the same inquiries a few years ago. It is now emphatically true, that "the child is born one hundred years old." One calls this the "reading age." We read from the nursery to old age. The newspaper, the novel, the school-book, or work of thought and science, are found in the hands of all. The laborer goes to his toil reading the penny paper; the merchant to his counting-room, holding in hands the larger sheet; while clerks, apprentices, mechanics, fill up their leisure time with the reading of such books as their inclination or education disposes them to prefer. The perfection of our common-school system, and the increase of libraries, encourage this universal practice.

Importance of eye to the student.

Demands of the age.

That scourge to literary people, usually called "morbid susceptibility of the retina" —distinguished by intolerance of the continued use of the eyes, floating specs before it; with pain in the brow, if use is persisted in—usually has nothing to do with the retina. It is the fault of the allies, and sympathizing organs, and the excitable condition of the nervous system generally, and the consequence of neglecting the general health. Ten nerves go off from the brain, six of which are distributed wholly upon the eye and its appendages, and the other four partially so. It is not difficult, therefore, to understand why every derangement of the nervous system should be likely to affect this organ.

Symptoms of injury.

Nervous relations of the eye.

It is said that students suffer more in this country than in Europe; and there may be some especial reasons. Frequently the most feeble of the family is selected for the pursuit of literature, because it is regarded "*easier*;" or a literary life is chosen as men select a wife, without any regard to physical organization or physiological principles. Our brilliant, unclouded atmosphere, our

American student.

Literary life—how selected.

Reasons for the decay of eyesight peculiar to United States.

painted houses, absence of blinds and shade-trees, and frequently of curtains, the presence of snow in winter, our furnace-heated apartments, the practice of using gaslights without shades, and the want of proper ventilation, our proneness to dyspepsia, our disposition to excessive activity, and extreme desire to be regarded dignified, which prevents the use of sufficient exercise—all furnish reasons—many of which obtain to our own students rather than to those of Europe—for the failure of the eyesight.

In the earlier and healthy stages of his career, the student is apt to regard his eyes as in no danger of giving out. He has always used them with impunity; and he thinks he always can. "As he advances in his course, new demands for exertion present themselves; new temptations multiply; new sources of information are thrown open to him; his eyes begin to exhibit alarming signs of inordinate use; but, they are too often disregarded, until incurable disease numbers him among her victims. He learns, when too late, that he has closed the widest door of knowledge to the soul; and is left to mourn, with many a kindred spirit, the premature

Results of inordinate ambition.

sacrifice of his usefulness and power." The eye works with material organs. Its intimate nervous sympathies with the other parts of the body, and its dependence upon the healthfulness of the whole framework, causes it to suffer from unscientific and extravagant use, and the results of ignorance and unjustifiable ambition. Still, it is the firmest organ in the body, and can bear a great deal of abuse. A mere glance at its external appreciable structure—its two curtains, by which it is protected and covered during sleep, the inner covering of which is so polished and adapted, as continually to clear and fit the intricate organ for the transmission of rays—will suffice to furnish evidence, to the most ordinary observer, that such a piece of mechanism may be readily deranged. The only wonder is, that it endures so much. Intellectual operations within proper limits, promote the health of body and mind. Individual experience is the best guide with regard to over-use. The eyes sometimes feel strong; at other times, not. Periods of great mental excitement are unfavorable to a considerable use of the organ. When any function of the body is considerably deranged, the eyes should

Reasons why.

Individual experience best guide.

not be excessively employed. While attention to the subject on the part of the student is of the highest importance, still, thinking and talking of diseased conditions, sometimes has seemed to produce in colleges an epidemic which obliges many temporarily to leave. Mind and matter are so intimately associated, that the influence of one upon the other must be constantly regarded, in considering the causes of disease. The common impression, that of all other organs, the eyes are least likely to fail, leads to the contraction, on the part of students, of many bad habits, which lay the foundation, in many instances, of serious diseases.

College epidemics.

The adjustment of light is perhaps the most important point to be regarded by the student. Alternations of light and darkness distress weak eyes, and debilitate those which are sound. Nature has caused the light of day gradually to fade away into twilight, and at length to total darkness, and when the sun re-appears, he who rises betimes finds at first a light so modified, that when the full light of day is developed, the eyes are prepared to bear it without pain or danger.

Adjustment of light.

Blindness from amaurotic affections is most common in countries where there is not light enough—where the eyes are too constantly exposed to artificial light. Little injuries often repeated do the mischief. Many illustrations could be given, showing the advantage of a change of apartments, thereby curing the disease under which the student was laboring. The position of the bed in relation to the window, so that the eyes are not exposed to a strong light on awakening; the sudden transition from dark to light rooms; the degree of light in the study-room; the lighting of the breakfast-room; the manner in which the light falls upon the page—are all most important considerations, though apparently trifling in themselves. Too little light debilitates the eye, and compels overaction; too much dazzles and confuses, and causes morbid sensibility of the organ.

Little injuries.

Apartment.

Bed.

Breakfast-room.

Light.

The student should not after sitting in the dark to meditate awhile suddenly commence his studies: and when begun, should not save candle-light to the sacrifice of eyesight. There should be sufficient light to see easily; not more. The light in the

room should be equally distributed, not reflected, or concentrated. There are many illustrations of the evil effects of concentrated light. Light reflected from white walls, within or without the room, or from the pavements where the windows open to the floor, or from white glazed furniture, is undesirable. The windows should be protected by blue or green curtains; the room should be painted blue or green; the carpet should be green, for nature has universally painted the world this color. The advantage of blue for the walls and curtains has been pointed out in the chapter upon lamp-shades, to which the student should turn for further suggestions on this subject. Pecuniary considerations are of little importance, when we regard the value of the eye, compared with procuring a suitable place for literary labor. There should not only be light enough, but of the right kind. Oiled paper has been suggested as furnishing a good shade for the lamp; it certainly has great advantages. The practice of wearing green shades is bad, unless there is a deficiency in the prominence of the eyebrows, or peculiar weakness of the eyesight.

Concentrated light.

Green carpet and curtains.

Lamp-shades.

Eye-shades.

Reading and writing by twilight or moonlight, or gazing at the moon—the necessity of so doing has frequently blinded astronomers—looking at lightning, visiting panoramas—are all attended with danger to the eyesight.

Twilight.

Astronomical observations.

A good panorama, next to an actual visit, furnishes the very best idea which can be obtained of the appearance of the objects and countries illustrated. But they should be visited with the constant remembrance that the perpetual transition of light and darkness, the glare of fire-works, and the intensity and concentrativeness of light is not unattended with danger. Reading by side-light, or in any position which causes more light to fall upon one eye than upon the other, is likely to be injurious. Sitting in front of a window with a quarto book on the knees; considerable use of a telescope or microscope without frequent intermissions; sitting with the back directly to any open window, and permitting a strong light to fall immediately upon the book or paper; holding a candle between the eye and book, are all practices likely to debilitate the eyesight. The light should fall—as before

Panoramas.

Direction of light.

remarked—obliquely from above, over the left shoulder.

When in the street, the student should protect the eyes from a burning sun by a wide hat-brim. The summer hat should be light and of a light color. Morning is, for most persons, the best time for study. Exposure to strong currents of wind—reading in bed—reading too much during and after sickness, the use of fine print books, the use of tobacco, especially the cigar have been named as among the causes of derangement of the eyesight. It is a valuable precaution for the student to contract the habit of frequently raising his eyes from the page upon which he is engaged, and fixing them for a few moments upon distant objects. This simple suggestion, if regarded, will prove of incalculable service to the student who would enjoy good eyesight. It is undesirable to employ the eyes considerably immediately after rising, or after a full meal, or during a period of great excitement of mind. Many students regard themselves obliged to write when the spirit moves, but it is possible so to discipline

Summer hat.

Other causes of disease.

Look at distant objects occasionally while reading.

Not always write when spirit moves.

the mind and habits, that, as a general thing, the spirit will move in a manner better calculated to secure physiological well-being, than is accomplished by many who strongly advocate this doctrine. One Saturday night's sermon—one literary effort protracted into the small hours, more enervates and depresses, than double the amount of labor at more seasonable periods. The evening study should not be such as to require considerable mental effort. Writing is better than reading in the evening; because, in writing, the eye is not so constantly strained to appreciate what is to follow: the mind having already conceived before the pen writes.

Midnight-work.

Proper work for evening.

Above all things, the general health must be preserved. Free air, exercise, and temperance in eating and drinking, are of the greatest importance. Says Beer, "The day-laborer may eat what he will, provided it is wholesome, and his eyes will not suffer. But let the student, who is called upon to devote, not only his eyes, but his brain to severe labor, live upon highly nutritious food, and what is of difficult digestion; we shall see how soon his

General health.

Live temperately.

Eat carefully.

vision will be impaired, through the vehement and persevering determination of blood to the head, which such a course must inevitably occasion."

Still I have no doubt but the conscientious student often errs on the other side. Attracted by some theory, he is induced to take too little nourishment, or from an excess of temperance, and a desire not to injure his influence, nor do harm by his example, he may deprive himself of the advantages which a mild stimulus, properly employed, will afford him.

Says Dr. George A. Bethune, of Boston, in the *Bibliotheca Sacra*, April, 1855, "We acknowledge that with most physicians, we feel very often a reluctance to advise the use of stimulants, for fear

May be overtemperate.

of the possible formation of a bad habit. But we have too often seen their good effects, when ordered by a practitioner bolder or less scrupulous than the greater number of physicians of the present day, not to feel strongly persuaded that there are many in our community who would be better for an occasional stimulant. It is true that one in perfect health does not need it—cannot be made better, and may be made worse

by it. But this is the condition of not so large a number as is generally supposed."

The subject of sleep is very important to the student, both in connection with his general health and the use of the eyes. Sleep. The student should not sleep too much or too little. In view of the doctrine alluded to, that life is a feverish condition, and that sleep is necessary in order to relieve that stage at which the system has arrived, at the period for slumber—it is of the highest importance that the student regard the punctual observance of his sleeping hours. It is probable, that although a few hours are gained by burning the midnight oil, there is a loss when we consider the aggregate of a student's life.

With regard to the evidences that the eye is suffering from over-use, and is in danger, enough has been said probably, in the former part of this chapter. To recapitulate a little; the student finds it necessary to apply the eye nearer to the object than before. There is a sense of painful distension—a feeling of warmth of the eyelids—they do not move with their usual facility. The eyes become moist when much used; a sense of weight and pain about the brows; the edges of the Evidences of over-use.

lids are thickened, and the white of the eye becomes red. Sight is somewhat dim and confused, head dizzy, the circumference of objects surrounded by a rainbow halo. When these and other symptoms manifest themselves, the student must *absolutely rest.* He must suspend all work; fix his eyes upon remote objects; use cold water freely; go into the country; and not resume his labors until all these symptoms have passed away.

Cold water.

The manner of applying cold water is important. The best mode probably is that which throws a small jet of water into the eye. This may be done by attaching a tube to a vessel in an elevated position, so bent that the current of water will be received directly in the orbit. The student may easily arrange one for himself, or if rich, may purchase a beautiful apparatus in any of our large towns. Opening the eyes in cold water has—as said before—some objections. The natural heat is abstracted from the eyes, and a foreign body is thrust in between the lids. Bathing the eye, by throwing the water upon it with the hand, is a very good substitute for the fountain.

Eye-fountain.

Opening eye in water.

ASTHENOPIA.

This chapter would, however, be incomplete, without reference to a somewhat different form of derangement from any alluded to, arising from the same causes as those hitherto described. It is scientifically called Asthenopia, from *a* privative, *σθένος*, strength, and *ὤψ*, eye (which implies feeble vision). Or, by the German writers, "incapability of sustaining the accommodation of the eyes to near objects." Although the patient, on viewing objects, generally sees them distinctly, the continued exercise induces fatigue; while he can employ his eyesight for any length of time upon distant objects. After reading, writing, sewing, or the like, there is a confusion and obscurity spread over objects; or there is a feeling of fatigue in the eyes which interrupts his exertions.

Asthenopia.

For a certain space of time, varying from a few minutes to several hours, the patient sees, with perfect distinctness, and with entire comfort, until warned by the symptoms before mentioned, to desist. After a short period

Symptoms.

of rest, the patient is in a condition to recommence his employment. If the use of the eyes for the inspection of near objects is persisted in, weariness of the eyes is apt to become more frequent and of longer duration; although many struggle on through a series of years, without any increase or diminution of the disability.

The structure of the eye is not diseased. No pain is experienced unless abused; nor is there any unnatural appearance. Pain, however, and slight inflammation sometimes occurs in consequence of persistence in their use. The general health is often good. The habit of body of these patients is generally delicate, and the disease usually occurs in early life. It is sometimes mistaken for near-sightedness, and frequently for that condition of the eyes which requires the use of glasses. Both eyes are usually affected about alike. There is a difficulty in employing the eyes by artificial light, and motes and specks are frequently observable before the eye. This derangement of the eyes is not apt to be succeeded by a more serious condition, or to result in blindness, without great indiscretion on the part of the patient. It is usually a lifetime affair. The patient seldom recovers again

the full use of the organ. There is no specific or effectual remedy which can surely accomplish a cure. Among clerks and book-keepers, apprentices to tailors, watchmakers, pattern-drawers, compositors, engravers, dress-makers, and seamstresses, we find many cases of asthenopia, arising merely from over-use of the eye. Students, especially those who engage in night work; or who, in the zealous pursuit of some favorite science, incessantly employ the eye, furnish subjects for the disease. This is more apt to be the case, if there is superadded excessive mental exertion, with loss of sleep. For various reasons, which are exhibited in Chapter VII., artificial light is more likely to produce this form of disease than daylight. The reasons are thus summed up:*

Who are liable.

Night work.

"*First.*—The defective chromatic constitution of the rays of artificial light.

"*Second.*—Their greater heating power in proportion to their illuminating effect.

"*Third.*—The formation and disengagement of carbonic acid gas, during combustion, which being

* Dr. James Hunter.

absorbed by the lungs, causes headache, and acts detrimentally, both on the eyes, and on the brain and nerves generally.

"*Fourth.*—The unsteadiness, and, generally, the disadvantageous position and direction of the artificial light employed."

Sleep, by suspending the sentient and muscular organs of vision, enables it to recover its vigor. This repose and renovation being denied, the eye inevitably becomes debilitated; thus, night work and night study produce this disease. Also pro-

Causes of Asthenopia.

longed investigations with the microscope, which, if persisted in, are often followed by effects fatal to vision. As has been before remarked, asthenopia is a disease which oftenest prevails among the young. Our hot-house, high-pressure mode of education frequently contributes to this result. A case is related of a boy, who attended school from nine, A. M., to four, P. M., with only half an hour's intermission, and spent the whole of his evenings in the perusal of "Chambers' Edinburgh Journal," a work printed in small type. This course resulted in asthenopia. Feeble girls, with scrofulous constitutions, and chalky complexions, are frequently sent to high-

priced boarding-schools, where they must be taught the most in the shortest possible time. Their apartments are heated to the highest degree, and badly ventilated. Their periods of exercise are short and few. They breathe the outdoor atmosphere at long intervals, and are forced to conduct themselves so genteelly that the native buoyancy of childhood has little opportunity for development. Nature, thus cramped and fettered, rebels, and the results are seen in the constitutions of those subjected to this kind of training. The natural development of the system is checked, and the martyred being is crippled in body and mind. Subject to a perpetual succession of tiresome, sedentary occupations, instruction of some kind, reading, writing, French, Latin, composition, drawing, logic, needlework, music, &c., fill up every moment of time. The eye has no opportunity to be occupied with distant objects, and its premature failure is only an indication of the feebleness of the whole framework. Over exercise of the eyes, while convalescing from disease, has sometimes produced this affection; or much reading during a condition of considerable general debility.

Modern system of education.

A certain kind of undue or improper indul-

gences is a frequent cause of this affection in individuals of both sexes.

Dyspepsia.

Persons subject to this affection should avoid all the causes which tend to produce it. Indigestion is frequently an exciting cause. In such cases, care should be taken not to overtask the digestive organs. The sight should be regarded as fatigued, whenever the object appears confused, or it is necessary to bring it nearer to the eyes, or the eyes become red, or feel heavy, hot, or are affected with a pricking sensation, or with a flow of tears. The moment any of these symptoms are felt, the person should cease his engagements, and occupy the eye upon distant objects, if possible in the open air. The patient should desist from everything which debilitates the nervous system, and if practicable, change his employment; so that his eyes would be occupied for the most part with distant objects.

Directions to an asthenopic patient.

The following are the directions of an eminent author, who was the first to call the attention of the profession to this condition of the eyes.*

* Tyrrell.

"Supposing a patient could work for an hour, but not longer, without producing disturbance of vision, he should then be directed to work for half an hour at a time, and to allow intervals of rest, of a quarter of an hour each; he can thus work for two-thirds of his usual time, while his cure proceeds. * * * * * The period allowed for employment should be short of that in which application produces the disturbance of vision; and the time devoted for resting the eyes should never be less than a quarter of an hour. Supposing that the impaired vision occur within half an hour, or less, after the eyes have been employed at work, it is best for the patient to refrain from work altogether for a week or two, until the affection be mitigated."

All the cautions and injunctions which are found in this chapter, in relation to the effect of overwork, refer equally to this affection. Glasses are sometimes of service, but should not be employed without competent advice; and if used, the lowest power should be selected. This condition of the eye is not benefited by even entire rest. Moderate, careful use, is better even than entire disuse.

I have alluded to this form of derangement more particularly, because it is precisely this which constitutes my own disability. Had I known the facts which are furnished in this chapter, I believe it would have been possible to have avoided the grievous disability under which I labor. I am able to do much reading and writing, but am forced to rest the eyes at longer or shorter intervals. This demand for rest is imperative, and will yield to no exigency without subsequent increase of disability. I would, moreover, remind my readers of a truth which I have learned by bitter experience, that the eyes may be occupied for a considerable period, and that too by artificial light, without furnishing evidence that their capability is becoming essentially injured. Again that some single act of overuse may prove like the "straw which broke the camel's back," fatal to their after integrity and perfect usefulness. This is precisely the experience of the author, having employed the eyes for a considerable period in literary labor, mostly at night, because that at that time there were fewer interruptions; a few hours' reading in the railway train sufficed to bring the

Author's experience.

eyes into the condition heretofore described. These suggestions are made with the hope that some persons, who are approaching the same condition, may be warned in time, and avoid results so unfortunate. Many persons who have spent the best part of their lives in acquiring information, are prevented by asthenopia from employing it practically, and are forced to change their habits and pursuits. The agriculturist need never fear asthenopia, and if the pursuits of the farmer are congenial with the taste, habits, and *physique* of the patient, the best thing he can do is to betake himself to such employment.

Farmer's life.

The physician spends most of his life in the open air, and in viewing distant objects. In full professional employ, he finds but little time to devote to literary pursuits. There is therefore no profession with which such a misfortune is less apt to interfere with his necessary engagements. Many tailors, printers, and engravers, who have this troublesome affection, do still continue their employments. By the exercise of prudence, much labor can be performed by the asthenopic patient; still he is seldom wholly freed from the realization of an evident infirmity. One of literary tastes can

still accomplish much, if he is careful to economize his eyesight, and not exhaust it upon light—especially newspaper—literature. By management he may often read several hours a day.

CHAPTER IX.

AGED SIGHT.

"My May of life
Is fall'n in the sere and yellow leaf."

AGED people, in consequence of the decay of their functions, the absorption of their secretions, and the consequent change of position of the eye in the orbit, are liable to some diseases and conditions peculiar to themselves.

A few old people who have constantly employed their eyes, enjoy immunity from the use of glasses. These cases are usually among those who did not enjoy clear sight in their youth, having been somewhat near-sighted, though the defect may never have been observed.

Some enjoy immunity from the use of glasses.

In a few instances, as has been before remarked,

Old people sometimes able to throw off glasses.

aged people have enjoyed what is called "second sight," and are able to throw off glasses, after having worn them from middle life. It is not frequent that the newly-acquired power is very valuable.

Cataract.

Cataract is a disease peculiar to old people, though not wholly confined to them. Its coming on is indicated by a variety of symptoms which are often mistaken. However, in the present state of the science, there is no known method of relief in its earlier stages. The only course, therefore, for the patient, is to permit the disease to go on until the sight is obscured. Frequently, by the use of some narcotic remedies, the ophthalmic surgeon may extend the usefulness of the organ somewhat longer. This relief is usually brief, though sometimes it may be continued for a considerable period.

Persons have been known, with cataract of that variety which remained a considerable time in a state of comparative incipiency, to obtain useful vision by introducing occasionally a drop of the solution of the sulphate of atrophine. When not under its influence, they were forced to renew it, or grope about, blind, or nearly so. This may be

introduced with a camel's hair pencil; or an ointment containing the drug applied to the lids or brow would accomplish the same purpose. The eye receives no injury from the application, though some temporary inconvenience is produced, sometimes in a slight degree, by the loss of the power of adjustment. This drug has the power which most narcotic articles possess, with regard to the eye, of dilating the pupil, and thereby the point of distinct vision is somewhat further removed.

Fall in the upper lid.

The dropping down of the upper lid, and the rolling over of the under lid, are diseases usually of old age. It is owing to a relaxation of the skin, and a loss of its elasticity, as well as the absorption of the fat from the surrounding parts. The disease may be relieved by operation. When not caused—as it often is—by the past or present intemperate habits of the patient, it may result in a perfect cure. The eye of an old person, in consequence of the changes alluded to, and the loss of the coloring pigment of the eye, changes its appearance, color, and expression. The edge of the cornea, or white of the eye, loses its transparency, but it produces no effect upon the sight, and is of no practical importance.

There is no reason why the eye of an old person should be blood-shot, red, and disfigured. It is a common mistake to regard this as one of the necessary infirmities of age. Old people themselves, who suffer in this manner, are very apt to regard it as an infirmity consequent upon their age, and fail to seek a remedy. I have found many of this class of cases more amenable to treatment than those of younger persons. The active period of life being passed, its great duties accomplished as far as they ever can be, they are often in the position of waiting for their last change. They therefore have little use for the eyes, and the treatment consequently is not embarrassed by their overuse. The constant use of the organ, in conditions of debility, is the greatest impediment to its rapid recovery, and, as before intimated, the producing cause of serious and permanent derangements of the eye. Old men who are exposed much to the open air, frequently fall into the habit of rubbing the eye with the hand, and even with the coat-sleeve, almost incessantly, which in itself is sufficient to perpetu-

Sore eyes not a necessary evil.

Why curable.

Use of the organ in debilitated conditions of the body.

Old men rubbing eye with coat-sleeve.

ate an ophthalmia. Old women, having little else to do, sometimes read too constantly, and frequently with the very same glasses that they used twenty years before. Thus the eyes are kept constantly inflamed. There is no reason, in a large majority of cases, why, to the infirmity of aged people, there should be added that of imperfect sight, except the natural disabilities before alluded to. There is no reason why the eye should be red and unsightly, and this condition of things is permitted to continue by the octogenarian, because he regards his work as done, and thinks his "old body not worth patching up." Still it is the duty of his juniors to regard his well-doing and comfort, and help him retain all the sight he can up to his latest day. It is a period of second childhood, and deserves the same care that children would desire to have bestowed upon them, should Providence permit them to reach the same age and condition.

Old women should change glasses.

Disease of the eye in old people can be cured,

CHAPTER X.

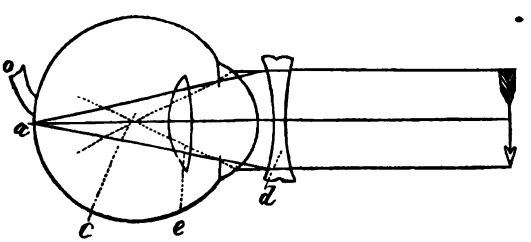
GLASSES.

"The difference is as great between the optics seeing as the objects seen."

Period of life when the eye fails.

THE age at which vision begins to decay varies greatly in different individuals, although forty is about the usual age at

Fig. VII.



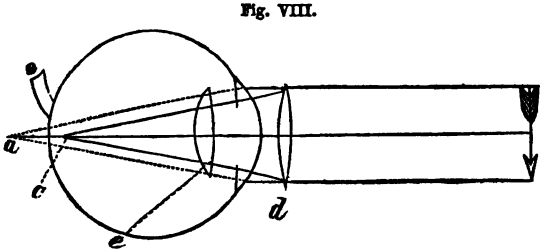
DESCRIPTION.—The above diagram exhibits the myoptic or near-sighted eye. Owing to the convexity of the cornea, the arrow would be represented at *c*, the point where the dotted lines converge, but for the interposition of the concave lens *d*, which brings the rays to converge at *a*, directly upon the retina; *e* represents a crystalline lens, and *o* the optic nerve.

which it is first manifested. Much depends upon the habits and constitution. Some have needed glasses at thirty-five, and others required none at eighty-five. The Duke of Wellington furnishes a remarkable example of the extension of this power into old age. That power which will enable a person to read without much exertion by candle-light, is the only one suitable. Glasses should not be used at first during daylight. The greatest caution should be observed in increasing the power. When discovered that the glasses first used no longer afford sufficient assistance by candle-light, the next power should be substituted, and the

Duke of Wellington.

Evidence of the necessity of glasses.

Fig. VIII.



DESCRIPTION.—The above represents the presbyotic, or far-sighted eye. The arrow would be represented at *a*, the point where the dotted lines converge, but for the interposition of the convex lens *d*, which causes the rays of light to converge at the point *c*, within the retina; *o* represents the optic nerve, and *e* the crystalline lens.

glasses before used, employed for day-labor only. By the exercise of great prudence, it is possible to attain considerable age without requiring glasses, but of a moderate power. Many persons ignorantly, or for the want of a suitable place where they can purchase, run through the whole assortment, and finally are forced to use the very highest powers. The following rules may be laid down with regard to this subject:

Rules to regulate their use.

First.—Young people should never use glasses with an idea of strengthening their sight.

Second.—They should be resorted to as soon as the eyes are distressed in the evening with ordinary work; more harm will ensue by abstaining from their use than by their judicious employment.

Third.—They should never be used indiscriminately, nor worn in the open air if it can be avoided.

Fourth.—They should be laid aside when scratched or broken, and when dimmed, should be carefully wiped with wash-leather.

Fifth.—As said by another, if people value their eyesight, they will shun cheap and imperfect spectacles, and puffing opticians.

Many buy glasses of peddlers, or select them as they would razor-straps, or penknives, without regard to the very great importance of their being manufactured with care, and adapted to the case. Cheap glasses.

The detailed history of glasses would furnish a very interesting chapter, but it is foreign to my present purpose.

This art is no recent invention, though of late it has attained very great perfection. The recent excavations at Nineveh have revealed a lens much like those now used. The re-discovery seems to have been made by an Italian, though it is attributed to Roger Bacon, a professor of Oxford, some time in the eleventh century. However there were no distinct rules as to their application, until 1575, when Maurolicus of Messina explained their use. To him and the original discoverers mankind are indebted for the aid which glasses afford, which extends the period of service and labor even up to old age. It has been said, that when glasses are required at the meridian of life, it indicates the close of the period of active service. But for the aid which glasses afford, of how much eminent services would the History of glasses.

world be deprived. By their use the mechanic may continue his labors, the scholar his studies, the artist may still display his skill, even into the evening of life, each benefiting their kind, enjoying intellectual pleasures, instead of wasting their days in melancholy, profitless idleness. They have now become a luxury, everywhere enjoyed. In a single village in Europe two hundred and thirty thousand pairs are made annually. The glass usually employed for lenses, is plate-glass of the purest quality. The nicest adjustment is necessary with regard to the proportion of its ingredients: silicate of soda, and lime. The lenses, by hand or machinery, are gradually rounded into shape, and smoothed down with emery powder.

There are six varieties of the common lens. The double-convex lens, *i.e.* two round surfaces together; the plano-convex, *i.e.* one side round and one side flat; the double-concave, *i.e.* two sides hollowing; the plano-concave, *i.e.* one side hollowing and one side plane; the concavo-convex, *i. e.* having one side rounding and the other side hollowing, but not meeting at the ends, as in the third variety. For practical purposes, however, spectacles may be regarded as

Varieties of glasses.

convex or concave to some degree, that is, presenting a rounding or a hollowing surface.

With regard to the selection of glasses, little dependence can be placed upon the numbers. There has not been entire uniformity in the numbering. Opticians commence with too high a power; moreover, the age of the patient, the normal range of vision, and other circumstances, must determine. He should take the lowest power which seem to aids the vision, and wear them for a day or two, in order to give them a fair trial; for the eyes become so excited by looking through a variety of glasses, that it is not easy to determine what power is suitable. They should be used to read, write, sew or perform ordinary engagements, placing the object a little nearer than would be natural to the naked eye. They should not magnify, but cause the object to appear a little more distinct and clear, than without their aid. If it magnifies, it is too strong, and will surely enfeeble the sight. The principal use of glasses is to sustain the sight, and relieve it from fatigue. With this assistance, the eye ought to be able longer to continue its labors. Every species of glass is calculated to lose the eye

The selection of glasses.

its facility of accommodating itself to distance. The stronger the glass, the more likely the loss of this faculty. Therefore no stronger glass than is necessary should be employed, and the eye should be frequently turned away to observe distant objects, and not look for a long time too intently without relief. Glasses should be carefully examined, by moving them backwards and forwards between the eye and the flame of a candle, to see that they are perfectly free from specks or veins, and to ascertain whether the figure of the lens is accurate, which may be done by passing each glass backwards and forwards between the eye and printed letters. The increase in the power of glasses should be almost insensible, and each number should be used as many years as possible. The best material for spectacle-frames is blue steel, which is neat, light, durable and elastic. Gold and silver are too dazzling. Oval eye-pieces are preferable to circular. They have an equal range of vision, and are lighter. Spectacles used for distant objects should have a frame, the front of which should be stiff—not liable to bend. Those used for reading had better have a frame elastic in the front, as well as sides. Spec-

Spectacle-frames.

tacles are made to answer other purposes, adapting themselves to various singular conditions; for example, a patient may be near-sighted in one eye, and long-sighted in the other. One can see distinctly horizontal, but not vertical lines; another was near-sighted as to vertical lines, and far-sighted with regard to horizontal lines. Again, with regard to cases which have been subjected to the operation for cataract; the lens destroyed by the operation, is substituted by an artificial one in front of the eye. Glasses have been prepared with small apertures or slits for persons exposed to Arctic voyages or snowy regions, intended to prevent too great accession of light into the eye. Spectacles of fine gauze tissue have been invented for the same purpose, and are sometimes used by railroad travellers. While writing this chapter, a young lady presented herself at my office, who could not read the largest letters without glasses; but she saw perfectly through a pin-hole in a card. I ordered for her a black enamelled glass with a small transparent spot in the centre. By this means she sees perfectly; the oblique rays which distracted her vision being shut out.

COLORED GLASSES.

Colored glasses serve useful purposes. Not those in the shops, however, which are found of every tinge of blue and green; but a glass of a hue called "neutral tint," resembling the color of the Chinese tea stone, so-called from its resemblance to a weak infusion of black tea—which checks the light, but is not in any considerable degree open to the usual objections of colored glasses.

Jewellers.

Jewellers' boys ought not to be kept constantly using the blow-pipe, without being provided with a pair of neutral tint glasses. They should be used only during the period of such engagement, and be taken off immediately upon rising from the seat. As far as possible, charcoal should not be used for the purpose of retaining the article which is exposed to the heat of the blow-pipe. It is said that pumice stone will answer the same purpose, and it is not open to the objection of emitting those violent sparks which, by the intense force of their light, are highly calculated to injure the eye. Manufacturing jewellers ought to feel themselves obligated

Blow-pipe.

to look after the interest of some men in their employ, who are too careless to appreciate it themselves; and their "boys," for whom they stand in loco parentis, are entitled to their watchfulness. Neither should they be allowed to look a naked light in the face, nor work too long at a time over the melters' forge, or with a blow-pipe. It would appear to me very easy to invent a double plain glass lamp-shade, the intervening space between the two shades being filled with water colored a light blue. A solution of ammonia sulphate of copper would afford the purest color. A round glass-burner encircled by a pale blue glass would yield a homogeneous white light, though not as pure and cool as that furnished by means of water. The inner surface of the lamp-shade used by jewellers, or indeed by anybody else, should not be glazed—had better not be white, but a dead pale blue. Colored glasses have led to the most serious abuse of the eyes. Many physicians, sometimes men of distinction too, recommend them almost indiscriminately for weak eyes. Except in cases of increased sensibility of the eye in consequence of disease, or when the eyes are temporarily exposed for a long time to a bright and

Good lamp-shade for jewellers.

vivid light, colored glasses are injurious. By their use the eye loses the power of determining colors, and a blackish tint is cast upon everything. They will, if their use is persisted in, produce many of the forms of disease, for the cure of which they are resorted to. When the eye has been strongly impressed with any particular kind of colored light, if directed to a white object, it will not be capable of determining whether the paper is white or colored; but it will attribute to that object a different color from the one that has made the impression.

Accidental colors produced by colored glasses.

Thus, looking through a red medium will cause objects to assume a blueish green color. Orange will make blue; yellow will produce an indigo appearance; green, a violet reddish; blue, an orange red; indigo, an orange yellow; violet, a yellow green; black, white; and white, black. Thus, then, the eye looking through a blue glass, becomes less sensible to blue light. Colored glasses are almost always used when there is undue sensitiveness of the retina. It is clear, therefore, that anything which blunts that sensitiveness should be avoided. Therefore neutral tints are to be preferred, because they are of no particular color. Care should be taken not to select

of these too dark a shade. A brownish grey is to be preferred. When they are required, and are properly worn, they are serviceable. As light a shade should be chosen as will answer the purpose, and when possible, should be changed to lighter tints. As before said, when taking them off, the eye should be closed for a second or two, to render the contrast between shade and light less marked. It should be remembered also that dark tints are liable to heat the eyes by the absorption of heat. This will be illustrated by Franklin's well-known experiment to demonstrate the relative heating properties of the two colors. He covered two patches of snow with cloths, the one black and the other white. The snow under the black cloth soon melted, while that under the white remained unaffected. Though apparently trifling, this is a very important objection to a morbidly sensitive eye, which feels hot after being covered a little time by a dark glass. The use of veils are objectionable for the same reasons that have been adduced in relation to colored glasses.

Directions for the selection of colored glasses.

CONCAVE GLASSES FOR NEAR SIGHT—*See page* 81, *Chapter V.*

CATARACT GLASSES.

Cataract glasses. Why necessary.

The operation for cataract destroys the crystalline lens, and eventuates in its being removed from the sphere of vision. The patient, after operation, complains that objects are dim. There is only a slight diminution of the refractive power of the eye, but the faculty of accommodating itself to different distances is materially affected. To obviate this defect glasses are employed. The pupil is enlarged, and on this account, the patient is enabled to see in variable degrees of perfectness. By exercise, the sight is capable of considerable improvement. Different eyes require different numbers, or glasses with different focal lengths. There is the same danger with regard to increasing the magnifying powers of cataract glasses, that has been pointed out in the use of other kinds of spectacles. A glass should not be worn until the eye is completely recovered from the operation. The first glasses selected, if at the age of 30 or 40, will not require to be changed till about the ages of 50 or 60. If an old person, which is usually the case, they will

answer to the end of life. Glasses, properly selected, will enable the patient to return to the finest work in which he has ever employed his eyesight, such as drawing, reading, writing, sewing, and the like. The test of the proper glass having been obtained, is that the person can see objects perfectly at the same distance at which he saw them before the operation.

SPECTACLES FOR DOUBLE PURPOSE.

Says Franklin:*—"I cannot distinguish a letter even of large print; but am happy in the invention of double spectacles, which serving for distant objects as well as near ones, make my eyes as useful to me as they ever were. If all the other defects and infirmities were as easily and cheaply remedied, it would be worth while for friends to live a good deal longer, but I look upon death to be as necessary to our constitution, as sleep. We shall rise refreshed in the morning."†

* Franklin's works, Vol. VI., Philada., 1817.

† Extract from a letter of Benj. Franklin to George Wheatley, Esq., dated "*Passy, near Paris, Aug.* 21, 1784."

And again:—"I imagine it will be found pretty generally true, that the same convexity of glass through which a man sees clearest and best at the distance proper for reading, is not the best for greater distances. I, therefore, had formerly two pair of spectacles, which I shifted occasionally, as in travelling I sometimes read, and often wanted to regard the prospects. Finding this change troublesome, and not always sufficiently ready, I had the glasses cut, and half of each kind associated in the same circle.*

"By this means, as I wear my spectacles constantly, I have only to move my eyes up or down as I want to see distinctly far or near, the proper glasses being always ready. This I find more particularly convenient since my being in France, the glasses that serve me best at table to see what I eat, not being the best to see the faces of those on the other side of the table who speak to me; and when one's ears are not well accustomed to the sounds of a language, a sight of the movements in the features of him that speaks, helps to explain; so that I understand French better by the help of my spectacles."

* From the same to the same, dated "*Passy, May* 28, 1785."

Mr. John McAllister, of Philadelphia, who in experience is excelled by none other, prefers very much the plan of Dr. Franklin. In a letter accompanying the letter of Franklin and Jefferson, which he politely furnished the author, he thus remarks:

"I do not recollect when my father began fitting up spectacles with two foci—for *near* view and *distant* view. The spectacle branch of his business was commenced in 1799—I think, however, that when Mr. Jefferson wrote to him, in Nov. 1806, to have a pair prepared in that way, the thing was not new to my father, and it is probable that he had before that time occasionally made up a pair specially for some person. I think we had heard that Dr. Franklin was in the habit of wearing such spectacles, for, as nearly as I can remember, we had called it the *Franklin plan.*

"Spectacles with two sights have been much used, and are found to be very convenient. Many clergymen wear them always in the pulpit. Some have at first thought there was a little inconvenience from the slit separating the glasses, but they have soon become accustomed to it. I have never heard of any person who considered the use of them in

any degree injurious—nor can I conceive how they can be prejudicial to the sight.

"Mr. Jefferson, in the first instance, in order that he might look around him without the glasses, tried spectacles with narrow eyes, which my father had prepared for him. After the death of Mr. Jefferson, in 1826, several of his neighbors in Virginia wrote for similar spectacles—we had orders for a considerable number.

I believe Mr. Jefferson continued to use these very narrow eyes while he lived. It is probable, however, that he did not so much use the small 2 foci, for each half glass was of such reduced size that he might find it difficult to catch the view. I do not remember, however, that in any of his subsequent letters he spoke of an inconvenience from using them."

The following is a copy of Mr. Jefferson's letter before alluded to:

WASHINGTON, *Nov.* 12, 1806.

"SIR:—You have heretofore furnished me with spectacles so reduced in their size, as to give facility to the looking over their top, without moving them. This is a great convenience, but the reduction has

not been sufficient to do it completely. I therefore send you a drawing, No. 1, so much reduced in breadth, as to give this convenience completely, and yet leave field enough for any purpose: and I will thank you for a pair of spring frames, made accurately to the drawing, and a set of glasses as mentioned in the same paper.

"Those who are obliged to use spectacles know what a convenience it would be to have different magnifiers in the same frame. Dr. Franklin tried this by semicircular glasses joined horizontally, the upper and lower semicircles of different powers, which he told me answered perfectly. I wish to try it, and, therefore, send you a drawing, No. 2, agreeably to which exactly I will ask another pair of spring frames to be made, and a complete size of semicircular glasses, as mentioned in the paper. These will of necessity give up in part the other convenience of looking over them. With these glasses I will pray you to send me a pair of goggles with clear glasses, and a little case of three magnifiers of different powers, shutting up in a single horn-case. They are used chiefly for reading off the fine divisions of astronomical or geometrical instruments, and are commonly to be had in the shops. The drawing in the margin gives an idea

of the thing when all the three magnifiers are out. I presume these articles, placed between two pasteboards, may come safely by post. The amount shall be remitted you as soon as known.

"Accept my salutation and best wishes.

"TH. JEFFERSON

"MR. MC. ALLISTER."

Mr. Franks, of Park Row, has patented a glass which he regards better than any other before in use. This is a question which experience must decide, and the author has had none.

A round German glass is in the market, the upper third of which is so ground off as to furnish a different degree of convexity.

The venerable Benjamin Pike, Senr., used to furnish spectacles with four glasses, two of which turned up, so as to assist the lateral view in walking; turning them down on their hinges, a reading-glass was arranged quickly, which had the disadvantage of weight and obliged the wearer to see through two glasses instead of one.

If the plan of Mr. Franks does obviate the necessity of an opaque spot in the centre of vision, and can be accurately ground, it would seem to furnish a desideratum. (*See diagram on next page.*)

Fig. IX.

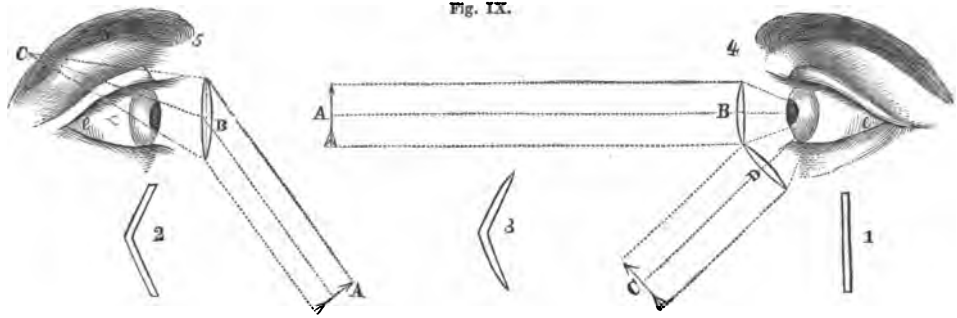


Figure 1 is a side view of a piece of transparent sheet glass, which is made sufficiently hot to bear bending at the middle, so as to produce the form as Figure 2. The upper surface of Figure 2 is ground to the proper magnifying power to enable the wearer to see objects at a distance. The lower surface is ground to the correct focus adapted for seeing small objects near the eye. When finished we have a lens resembling that shown at Figure 3, all made of one piece of glass.

Figure 4 is an eye looking through one of these glasses. A is supposed to be a distant object which the eye is looking at through the upper part of the lens marked B. The image of the object is required to be depicted at the bottom of the eye at *e*. Trace the rays of light from C, they strike the lens D at right angles with its surface. The depreciated capabilities of the aged eye conveniently bends them to a point of union on the nerves at the bottom of the eye at *e*. Thus we have one pair of spectacles which enables us to see, by the simple motions of the eyeballs alone, both near or distant objects.

Figure 5 is an eye looking through the old form of spectacle glass. The entire want of parallelism between the plane of the surface of the lens B and the object A is evident. The lines of light reflected from the object A strike the surface of the lens B (in Figure 5) obliquely, instead of at right angles with its plane. The indirect inclination of the rays of light thus given to them, as they pass through the lens B towards C, instead of at *e*, where they should meet, occasions a constant straining of the weak or aged eye, in endeavoring to force the light out of its improper. into its proper direction, and bend to its legitimate point at E

ABUSE OF GLASSES.

It is by the abuse or mismanagement of the eye, during periods of disability, that it most frequently suffers injury. This wise provision which human ingenuity has discovered to relieve defective vision, often, when misapplied, operates greatly to the injury of the organ. The ophthalmic surgeon is very frequently asked, without regard to the nature of the disease, which has suggested the necessity of advice: "Shall I wear glasses?" Spectacles are regarded by the great public as a sort of catholicon for the relief of all sorts of maladies of the eye. Even the simplest form of inflammation is regarded as requiring their use.

Glasses regarded a panacea.

As has been suggested, at that period of life when there are unmistakable indications of the need of their aid, the neglect to use them from motives of pride, or a dislike to grow old, sometimes produces mischief, which may result in serious disease, if this course is persisted in.—It is said that the eminent Rev. Mr. Barnes, of Philadelphia, attributes

Common objections to their adoption.

the failure of his eyesight, in part, to the neglect of the use of glasses at that period when they should have been adopted.—Although no plan of treatment can remove, or even lessen, the consequences of advancing age, it is certain that whatever overfatigues the sight, and all habits that tend to increase natural decrepitude, or develop constitutional ailment, will aggravate this infirmity. Proper care, when exercised, added to soundness of constitution, must furnish the only cause to which we can attribute the facility with which, occasionally, persons who have not been near-sighted, are able to do without glasses, even up to old age. Still, it is silly to affect to do what one is not able.

Public lecturers.

Says a celebrated writer,* "I have seen a public lecturer, rejecting, from some foolish motive, the aid of convex glasses at seventy years of age, assemble on and at the side of his desk, six glaring wax candles, in order to illuminate his manuscript; and while he kept one of the candles, shorter than the rest, dancing over the paper, yet, he stopped ever and anon from a difficulty in deciphering it. Such

* Mackenzie.

conduct is as dangerous to sight as it is ridiculous. The presbyopic eye, if refused assistance, is necessarily strained by every attempt to perceive near objects, and suffers more in a few months by forced exertion, than it would do in many years, if assisted by such glasses as would make vision easy and agreeable." This learned author, when speaking of the indications which imply the necessity for adopting glasses, further says: "It would evidently be absurd to fix upon any period of life at which glasses should be first employed, or at which the presbyopic eye should be assisted by stronger magnifiers than those made choice of in the first instance; but it may be laid down as a general rule, that whenever a person at forty-five years of age, or upwards, finds that in order to see small objects distinctly, he is obliged to carry them far from his eye; that he moves, as it were, instinctively, nearer to the light when he wishes to read a work, or holds the book or other object close to the light, in order to see with facility; that very small objects, after he has looked at them earnestly for some time, appear confused; that his eyes, after slight exertion, become so much fatigued that he

Impossibility of naming an age at which glasses are necessary.

is obliged to turn them to other objects, in order to give them some relaxation; and that the sight, on awakening in the morning, is very weak, and does not recover its customary degree of force for some hours; then, he may, if he has not hitherto used convex glasses, begin to use them, or if he has already had recourse to those of a very long focus, he may change them for a pair of shorter focus, or in other words, of greater refractive power."

Why glasses assist the sight.

A double convex glass improves the vision, merely because it lessens the divergence of the rays of light proceeding from near objects, and thus ensures their being brought into foci upon the retina. (*See illustration, page* 181.)

Glasses, made use of by the near-sighted, should not make objects appear smaller; neither should the convex glasses, employed by the far-sighted, make them appear larger than natural. As has been said before, the lowest power, or longest focus which answers the purpose, is to be chosen. Convex glasses should be chosen with candle-light, as those which are sufficient in the daytime are often not strong enough in the even-

ing. After having been furnished with proper glasses, night-work should, as far as possible, be avoided; and when the eye begins to feel hot, or fatigued, the user should take the hint and stop.

GLASSES FOR THE NEAR-SIGHTED.

(*See page* 81, *Chapter V.*)

RULES FOR THE SELECTION OF GLASSES.

The following rules are given to direct the patient who lives remote from an optician, in determining the focal length of the convex glasses which he requires: "If they have a distinct vision of objects, *moderately remote*, let them multiply the distance at which they see minute objects most distinctly, say 20 inches, by the distance at which they wish to read by the aid of glasses, say 12 inches, and divide the product, 240, by the difference between the two, 8; the quotient, 30, will be the focal length of the glasses required.

"If the distance at which the person sees most distinctly be *very great*, then the focal length of the glasses required will be equal to the distance at

which he wishes to see the objects most distinctly."

Convex glasses are found in the shops, of every focal length, from 48 inches to 6. It is evident that no certain estimate can be formed of the focal length of the glass which he may require. The following may be found as an approximation to an average:

Years of age,	40	45	50	55	58	60	65	70	75	80	85	90	100.
Focal lengths (inches),	36	30	24	20	18	16	14	12	10	9	8	7	6.

The focus of a convex glass may be measured by holding it near the side of a room, facing a window, or opposite to the sun, and moving it slowly backward and forward, until the image of the window-frame, or of the sun, upon the wall, becomes smallest and most distinct; the distance between the glass and the wall, at that instant, is the focal length. Convex glasses of about 36 inch focus, are often used by ignorant people, under the name of preservers, before glasses have become necessary. They think that these so-called preservers have some specific power of arresting the progress of that failure of the eyesight, which is the natural consequence of age.

But it is their use mainly, rather than their neglect, that oftenest is the producing cause of harm. As the opium-eater finds delight in the stimulus which an increased dose affords him, so, he who requires glasses and employs them, if he shall certainly increase the power, will experience the most delightful sensations. If merely for experiment he tries a higher power, he will find that the number he has been accustomed to use affords a dimmer light, and he employs it after with less enjoyment. If indulged, the eye ever requires "give," till at length the end is reached, with the loss of the integrity of the visual range for remote distances; moreover, the glasses have become now indispensable, and large objects are seen with less distinctness. This result is irreparable, and might have been prevented by attention to the suggestions before made; that is, constantly employing the lowest number that would answer the purpose.

Danger of increasing the power.

The dentist advises his patient, whom he has supplied with a set of artificial teeth, that hereafter he must remember that they will not bear the strain and wear of his natural teeth; but that he must ever be mindful, and use them as

Care required.

lightly as possible. So, he who comes to the point of using glasses, must remember that his eyes will no longer bear abuse as formerly, that they must be treated with care and moderation; especially should their use by artificial light be avoided.

Indistinct writing, fine-print books, pale ink, white writing-paper—blue is very much better—reading by fire-light or feeble light, and especially reading in railway cars and carriages, are to be most carefully avoided. A large number of persons in the neighborhood of New York spend from one-half to two hours every day in riding. Coming into town from their suburban homes, they buy the paper at the earliest moment possible, and read it on the way to their place of business. In the afternoon they leave town with the latest edition of the evening paper in their pocket, designing to peruse it on their way homeward. Thus their eyes are taxed to read a faintly, closely-printed column, as it dances before their eyes, during an hour or two every day, greatly perilling thereby the usefulness of organs upon which they greatly depend. To-day, while

Reading in the cars.

revising this matter, a New York merchant, holding up his eye-glass, remarked, "I lost the use of my eyes by reading in the cars." Observe the passengers in the train, on any of our public routes. A shelf of popular novels is passed before the eyes of every individual; next, a pile of popular magazines, then, illustrated newspapers, while advertisements, guide books, and newspapers with long, narrow, closely-printed columns are distributed or purchased, until all tastes are suited, and before all eyes, young and old, spectacled and otherwise, there oscillates some kind of printed page. Opportunity for fresh air is lost at the stopping-places, while the eyes are eagerly strained and worried over the plot of some novel, or a column of the details of some foreign intelligence, the gist of which could be written in a sentence or two.

Newspapers.

The universal practice of newspaper-reading in this country is injurious to eyesight, because of the fine and necessarily imperfect print which they afford, while their use to the exclusion of more material and substantial reading is enervating to the mind, and promotes superficial tastes and habits. Sudden transitions

from comparative darkness to bright light should be avoided. It is very important that one using glasses should frequently interrupt his labors, and not look too long intently upon a single object.

Sudden change.

Allusion has been made to the use of quizzing glasses. Enough should be said on this subject to induce young people to avoid a practice which frequently originates in affectation and folly, though it sometimes obtains from short-sightedness. Many have had occasion to regret the use of one-eye glasses to the end of their lives. To smoke a cigar and wear a quizzing-glass satisfies a kind of ambition at one point in life—a period when youth peculiarly need direction. The sight of the eye upon which the glass is mostly used, frequently becomes impaired. In the language of another, "The consequences to perfect vision are serious; for, as one eye is made to do more work than the other, an alteration in their relative strength takes place; the result is, that sooner or later, when the person resorts to spectacles, he finds that the lens which suits one eye will not at all suffice for the other."

It should be known and remembered that

dyspepsia, in its multifarious forms, frequently produces derangements of vision, which may readily be mistaken for a want of, or abuse of glasses, while it has nothing to do with either.

CHAPTER XI.

IMPROPER TREATMENT OF DISEASED CONDITIONS OF THE EYES.

"The beautiful is vanished and returns not."

Before entering upon this topic, I would premise that it is of the highest importance for the relief of diseased conditions and natural imperfections of the eye, that spectacles should be selected with care, and from persons who understand the subject, and who will not furnish, under any circumstances an improper or imperfect article.

Competent opticians.

Persons, requiring glasses, are advised to seek out reliable dealers of commercial integrity, who are readily distinguished from quacking, boasting dealers whose prices are as large as their pretensions. The statements of the dealer about the article that he sells—for exam-

ple with regard to the number of the glass, or the certainty of its being "pebble," if so represented—must be taken by the purchaser. There are not many competent dealers, and there must be fewer competent buyers. Those who cannot purchase in the larger cities, where a dealer is found suitable to advise, should seek out honorable traders, who will not say what they do not know. Such are found in most towns of any size.* Each of these cities may contain other names than those mentioned in the note, equally reliable but unknown to the author. Several other of the larger cities, probably, contain excel-

* *New York City.*—Benjamin Pike & Co., and Benjamin Pike, Junr.—Franks—Wise.

Philadelphia.—McAllister & Brothers.

Boston.—Widdifield & Co.

Washington.—M. W. Galt & Bro.

Richmond.—Mitchell & Tyler.

Norfolk.—C. Hall & Co.

Baltimore.—P. B. Sadtler & Sons—F. W. & R. King—John Jones.

Louisville.—Fletcher & Bennett—John Kitts.

St. Louis.—Jacob Blattner—Jaccard & Co.

New Orleans.—Clement Duhamel.

Charleston, S. C. William H. Ewan.

Newark, N. J.—John Price—A. H. & J. W. Miller.

New Haven, Ct.—Benjamin—Olmsted.

Hartford.—A. M. Ward.

Bangor, Me.—John S. Tompkins.

lent opticians, whose address is not at hand. The selection of glasses having been shown to be a matter of great importance, enough has perhaps been said to indicate the propriety of purchasing of reliable parties.

Probably no single cause produces more serious derangement of the eye than the improper selection of glasses. Unless scientifically applicable to the case, they can hardly fail to be injurious. There is much quackery on this subject, and several of our large cities contain some eminent quack. Reliable dealers should be sought out. Glasses are not to be selected like a watch-key or a breast-pin, because of the beauty of the frame, or merely as an article of dress. It is better not to get an expensive gold frame; at least unless it is adapted to new glasses. The glistening metal is unpleasant to the eye, and sometimes proves injurious.

Selection of glasses.

No human forethought or care can prevent the occurrence of disease, and in the present state of society—with the occupations incident to it—of diseases of the eye. But it is during these periods of derangement that the eye is most essentially injured, and the foundation laid for protracted and serious

ailments. A reference to the complicated structure of the organ, to the great varieties of tissues concerned, to the multifarious functions performed, and to the delicate nature of these offices, is sufficient to suggest to any mind, that the mode of treatment is of the highest importance during the period of derangement. If a watch gets out of order, if a single pin is loosed, or a wheel misplaced, the watchmaker will stop it, and hang it up till he has leisure to examine it. A slight misplacement in a steam engine will lead to the destruction of thousands of dollars' worth of property in a few minutes, before the engine can be stopped and the evil remedied. The human eye is far more complex than any piece of mere human mechanism.

Reasons why the eye suffers from mismanagement during periods of derangement.

Many persons pass along to middle life, enjoying an entire immunity from derangement of the eye, when at length, a little overwork, or a severe cold, brings upon them an ophthalmia of some description. The net-work of vessels over the anterior portions of the eye become enlarged, so that the contracted calibre, which by a wise provision of Provi-

A model case of injury from persistence in use after disease occurs.

dence only received the white blood, now admits the larger red globules, and the eye becomes what is called bloodshot—strong light distresses it—continued exertion is intolerant, or perhaps the inconvenience is not considerable. The patient now pursues his ordinary avocations, feeling that the particular thing in which he is engaged must at least be finished, and his eye, consequently, grows worse very fast. However important the use of his eye may be to him, nothing would really be so *profitable as to stop at once.* Jewellers, engravers, scholars, stitchers, all whose eyes are directed closely to small objects, when they perceive sparks of fire, black motes, waving lines, misty vision, or find light or use intolerant, should at once desist from their employment. Every line, every page they read, every stitch they take, every word they engrave, is done at great risk to eyesight and endangers the ultimate loss of the usefulness of the organ.

Imprudence of not stopping when the eye is diseased.

After having aggravated the disease by requiring of the eye continued exertion, the common practice among many people is to turn to some friend, who knows as little about the matter as themselves, and inquire,

Bad advisers.

"What is good for sore eyes?" The friend is almost certain to remember some of the popular remedies employed for this purpose, whose names are legion—founded upon the notion that all disease of the eye is of the same character, and requires the same remedy. The pain in the eye absolutely enforcing rest; it recovers perhaps in a few days, in spite of the remedy; or perhaps, by chance, the remedy might have been serviceable. This unprofessional advice, on the other hand, not proving serviceable, and the eye growing worse, the patient next, perhaps, applies to the apothecary for some of the patent washes, or unguents, which are advertised as suitable to every form of disease of the eye. Now and then these prove serviceable; very accidentally, being suited to the particular case, and the advertised remedy gets reputation. Much oftener, however, it greatly aggravates the disease, and he at length is forced to seek professional advice. If he has not neglected too long, and his adviser is competent, he usually recovers at length, having suffered great inconvenience and loss of time, besides having paid a much larger bill than he would have done had he applied earlier.

Advertised nostrums.

It is eminently true, in the treatment of diseases of the eye:

"If it were done, when 'tis done, then 'twere well it were done quickly."

Protracted and lingering cures, and the dilatory procrastinating course to which I have alluded, are oftener productive of more serious chronic diseases than all other causes combined. If inflammation of the eye is not cured very promptly, there scarcely ever fails to be left behind a diseased condition to a greater or less extent.

Eye should be cured quick.

POPULAR NOTIONS AND REMEDIES.

Many popular remedies are good, and originated in sound judgment; many others have come down to us from an antecedent period of crudities and absurdities. Most popular doctrines and remedies were once held by the profession who, under the light of fresher observations, have long since forgotten them. The public, however, hand them down from father to son, and

Antiquated remedies.

Popular remedies.

the doctor finds some remedy gravely suggested, which he only knows as one of the curiosities of medical experience, which he has stumbled upon in the musty records of centuries past. It is unfortunate with regard to popular remedies, for diseases of the eye, that they are very seldom appropriate or safe. Between these remedies, some of which are even prescribed by physicians, and quack remedies, which oftener work evil than good, the eye has to run through a very severe gauntlet. Thousands of eyes are annually lost in this country by this means. There is, perhaps, no organ in the body upon which quackery and ignorance might not more safely practise. The popularly educated mind frequently persists in regarding disease as a unit, and this doctrine leads to many fatal mistakes in the practice of a class of men who boast of being their own physicians. It is said of the man who is his own lawyer, that "he has a fool for his client." In medicine this is most emphatically true. Much observation and experience in *seeing* diseases of the eye is necessary to their just appreciation and proper management. The sum necessary to

Popular remedies seldom safe.

Diseases of the eye must be seen.

procure competent advice is invested in the most profitable manner.

Popular remedies consist mainly of poultices, washes, and bandages. By far the larger part are in all cases totally inapplicable—destructive indeed to the integrity of the organ. To this class belong, among many others which could be named, warm poultices, which have, within the author's own experience, destroyed many eyes, and irreparably injured a great many more. I have seldom failed to detect immediately upon looking at the eye, the fact that a poultice had been applied, and it scarcely ever fails to render the case more unmanageable afterwards. A class of poultices are frequently employed, usually cold; they are composed of scraped potatoe, scraped apple, rotten apple, alum curd, carrots, plaintain leaves, slippery elm, house-leeks, onions, raw oysters, white of egg, honey, egg-skin, calcined oyster-shells, tobacco, &c. These articles, instead of producing any useful effect, are, for the most part, absolutely injurious, in consequence of their weight and their poultice character. The least reflection will make the cause of evil apparent, even to the unprofessional reader. Is matter

Poultices.

collected anywhere, the popular and proper remedy is to poultice, and thereby induce it to find exit. This is done by inviting an increased flow of blood to the part; all the blood-vessels are enlarged, an inflammatory condition ensues, and at length a rupture takes place. This is always the effect accomplished by the combination of heat and moisture. When required, it is this very quality which produces its effectiveness. The inflamed eye requires exactly the opposite treatment. Excitement, instead of quietude, a diversion of blood *to* instead of *from* the eye, and the very serious increase of disease, and if persisted in, the loss of the organ, will be the result of this treatment. The alum curd may sometimes be useful on account of its astringent properties; but, for the reasons just given, it is the most undesirable mode of application.

Alum curd, tea-leaves, &c.

The disgusting practice, which originated nobody knows where, of applying the tongue to the eye in order to remove foreign bodies, which have a lodgment under the lids, is sometimes even yet resorted to. The only proper way of removing them is by turning over the lid, which

Putting tongue in in the eye.

it is not difficult to do, when one is taught the mode by which it is accomplished.

A decoction of tobacco applied to the temples has sometimes seemed to be of service; but other means more safe are at hand for accomplishing the same purpose. The popular remedy of cold water is the only one esteemed valuable by the public, which is generally safe, and efficacious. It is valuable as a prophylactic and remedial agent, and in health, except too cold, usually safe. On the other hand, in the condition of disease, warm applications are sometimes found to be better, and cold water even aggravates the symptoms. With regard to the expediency of opening the eyes in cold water, as a means of preventing disease, there are doubts. It is introducing a foreign body upon a surface, lubricated by its own peculiar secretions, which are thereby washed away, and it moreover abstracts the natural heat from the eye, and the due performance of the functions of the organ may therefore be liable to interruption. My father,* in common with most of the New England divines of that period,

Cold water.

* The late Rev. Daniel A. Clark.

regarded this practice as part of his orthodoxy. It was then regarded absolutely essential that the water should enter the eye. The domestic, unadvised use of copperas, and lead, and saltpetre is often productive of considerable mischief. Of them it may be said, as of the patent advertised washes, that they may sometimes be applicable to the case, and therefore do good. These remedies, as well as zinc, of which Thompson's eye-water and most other lotions are composed, are valuable agents in the hands of the ophthalmic surgeon; but he would not dare to recommend them indiscriminately, nor would he decide upon the remedy, or the proper strength to be employed in a case, without careful observation and reflection. A solution made of alum, lead, zinc, nitrate of silver, cadmium, white-oak bark, tannin, green tea-leaves, or of any other astringent from the mineral or vegetable kingdom, if advertised into notice, would not fail to make reputation, because they would relieve some cases to which they might chance to be suited; but they would injure a great many more than they would relieve. Water, cold or tepid, is the only safe domestic remedy to be used

Copperas and lead.

Thompson's eye-water.

without advice. With regard to the eye, the progress of popular intelligence has not kept pace with other subjects. There seems in the mind of many a mystery about it; and to all that relates to it there is brought to bear too little common sense. The causes of this want of intelligence, I conceive, are the intricate and complex character of the organ itself, and the philosophical appreciation necessary, in order to understand fully the nature of its functions; and the fact that even among the profession, its diseases are less understood, because mere reading will not furnish the requisite information to treat them with facility and success. These popular errors, therefore, are not met, and the public mind is not disabused. It would scarcely be believed that ophthalmic surgeons are frequently asked by persons of respectability, whether the eye cannot be removed from the socket and again replaced; this has often occurred in my own experience. Cataract, which is a mere opacity of the lens, which is situated nearly in the middle of the ball of the eye, is regarded as a "film" upon the outer surface, and the surgeon is called upon to cut it off. All opacities of the eye are regarded as removable with the

Popular ignorance.

knife, which is true of scarcely any. Along with the doctrine that persons who use glasses about middle life can throw them off at an advanced period (this has occasionally happened), and many other propositions which a little observation would readily disprove—there has come down through two or three generations the "eye-stone." It is a small calcareous stone, which, when put beneath the corner of the lid, will work its way across the eyeball. It is said to have been first used at Guernsey, one of the Channel islands. It was formerly supposed to be endowed with life. When placed in a saucer, the bottom being covered with vinegar, because it moved about in consequence of the action of the acid upon the lime, it was regarded as evidence of its possessing animal life, and the mysterious thing enjoyed therefore a higher reputation. Its presence in our drug shops indicates the fact that the public mind is not entirely disabused of this prejudice. The fact is that its presence in the eye is no less injurious than any other smooth, innocuous, foreign body.

Eye-stone.

QUACKERY.

To exhibit the quackeries and impostures of so called "oculists and aurists" with which the large cities in this country and Europe abound, would require a volume. It would appear as if the eye and ear were the organs peculiarly selected by quacks in relation to which they display their ingenuity in extorting money, by exciting hopes, which they have no expectation of ever being realized. The suffering patient is so desirous of relief, that he easily believes, and as sight and hearing, from his point of view, are of such inestimable value, he cheerfully and liberally pays. The scientific surgeon whose opinion is of real value, can only be found by inquiry; his is not the name most prominent and most advertised; his object is to cure, the other's, for the most part merely to plunder. The solution of zinc which is advertised into notice under the name of Thompson's eye-water, has done an incredible amount of mischief. I could cite some cases in my own experience, and many more in the experience of others, who have the control of

Advertised washes.

Thompson's eye-water.

large public institutions, to prove the very injurious effect of this article. An eminent gentleman, who has occupied a leading position in an ophthalmic institution in a neighboring city for the last quarter of a century, informs me that he is constantly meeting with instances in which Thompson's eye-water and poultices are producing the most mischievous effects. He has frequently seen eyes destroyed from one or other of these causes alone. This article, however, is only the representative of a class, all of which are composed of about the same materials. Under this name, a zinc solution happens to have been more "liberally advertised." There will always be found those who will prepare these stimulant solutions, and write lying advertisements; and until there shall be a greater degree of public intelligence on the subject, these solutions will be used, and the eyes thereby injured. The same thing may be said of the eye ointments which are advertised. They are all composed of the same class of stimulants, or mercury in some of its forms, rubbed up with lard or tallow. As was said of the lotions, so these ointments contain articles valuable when legitimately and understandingly employed, while, for want of

Advertised ointments.

this intelligence they do very great injury. I shall mention as a sample one more of the recent humbugs which have obtained currency, and made money for many pretenders, in consequence of public credulity. An ingenious and enterprising man having somewhere met with a paper written by John Quincy Adams, in which that gentleman expresses the belief that the application of pressure to the eyeball gradually changed its form, restoring the convexity of youth, and enabling the individual to do without glasses and recover from their use after they had been adopted, conceived the idea of turning it to account.—Mr. Adams's theory was based upon the popular opinion that the form of the eyeball necessarily changes as age advances. —Eminent surgeons, who have had extensive practice in public institutions, express the opinion that this rule does not obtain to any considerable degree. This man, who was a theological lecturer, or anything that offered the best chance for success, prefixed his name, with "Prof." and at once commenced lecturing. He afterwards opened an office in New York, and advertised himself as a doctor, declaring his ability

Squeezing the eye.

to cure all diseases of the eye, and to relieve everybody from the encumbrance of spectacles.

He moreover offered to teach the secret at a fixed price, the learner pledging not to communicate the information furnished. Of course multitudes flocked thither, for nothing is easier in a large city than to attract multitudes to see or hear some new thing. The quack, by means of a lotion, managed to send some people away satisfied, in spite of the squeezing. Between his practice, and the imparting of his secret, he accomplished his purpose, which was to make money. Another man, also ingenious in his way, followed up the quackery by the invention of what he called "eye-cups," which consisted of little India-rubber cups, adapting themselves to the ball of the eye, and thereby making pressure more evenly, as was alleged with truth. Though this thing attracted considerable attention, it has passed away, and, like most of the pathies and isms of every age, has left behind it its nucleus of truth, upon which the superstructure was formed, to be added to the knowledge and resources of the scientific observer. This truth consists in the fact that the eyeballs of some are

probably susceptible of slight alteration by means of pressure.

Quack remedies.

Empirics and charlatans of every age have applied the most violent applications to this most sensitive and tender organ, and throughout all time domestic remedies have frequently been of an exciting and irritating character. Powdered glass and sugar, spirituous and amoniacal vapors, galvanism, and caustics have been freely used. These remedies would produce terrible inflammation in a sound eye, and cannot but be productive of serious disease in the inflamed eye unless used with discrimination.

CHAPTER XII.

ARTIFICIAL EYES.

"Some griefs are med'cinable; that is one of them."

French eyes.

Among the improvements of the present age, none have been more perfected than the one which provides a covering for the deformity occasioned by a lost eye. The French, who excel in all matters of dress and *bijouterie*, have invented a substitute, which furnishes, in some cases, a better eye than the original—that is, in point of appearance only. The illusion is perfect with regard to the casual observer, although it is false (as lying advertisers assert), that the motions of the eye are imitated, except as it may be accidentally acted upon by the muscles.

Artificial eyes do not move.

Many have been made to believe that the pupil

of the artificial eye really contracts and dilates. This is wholly false. Enormous prices have been demanded for artificial eyes, without reason or propriety. A man recently renowned for his notorious quackeries in New York, was frequently known to leave a patient in his office, step to an importer's, get an eye for ten dollars, return, introduce it—and charge fifty. *This is still done.*

The finest and best are procurable at a comparatively moderate price. They are prepared to cover the prominence which remains in the socket of the lost eye, and completely remove a hideous deformity. An artificial eye may be obtained to match exactly the color of the sound one. It is made of enamel, is a concave kind of a shell, both surfaces being entirely smooth. It is readily introduced, and does not usually produce any irritation. The wearer easily removes it at night himself, and replaces it in the morning. It moves to a great degree in harmony with the natural eye, and though carefully watched, it will often not be observed that the unison is less perfect than if the eye was not artificial. The eye being the expressive feature of the countenance, and the loss of it producing an appearance so disgusting, all persons who have

been thus unfortunate, should, if able, avail themselves of the remedy.

Manufacture of artificial eyes.

The manufacture of artificial eyes is very simple; the part imitating the sclerotica is formed of white enamel, with a tinge of yellow. The back side of the central piece is colored to look like the iris, and a patch of black enamel is put upon a surface of transparent glass. Lines of red enamel are melted into the surface, before the blow-pipe, so as to imitate blood-vessels. The artificial eye should be smooth and light. When first introduced, it should be worn only for a few hours at a time. It may be withdrawn with the aid of a silver probe, bent in the form of a hook; the lower lid being depressed by the forefinger of the left hand. The eye should be gently wiped with a bit of soft rag when taken out. While out of the eye, it should not be plunged into cold water, as it is apt to make it crack. If not properly annealed, they are apt to crack merely from the alterations of temperature to which they are exposed, while out of the eye during the night. When withdrawing it from the eye, which the patient soon learns readily to accomplish, he should

Directions for introducing it.

How to take care of it.

recline over some soft surface, in order that it should not be broken, if it chanced to fall. In order to accustom the eye to this foreign body, it may be necessary to use a series of plain eyes, beginning with one very small, until a bed is formed suitable for the reception of the eye which is of a proper size best to conceal the deformity. An artificial eye soon begins to lose its polish from the friction of the eyelids, and the tears and mucus.

The surface is seldom completely preserved more than three or four months, and in six months becomes hazy and somewhat rough. This fact, and their unnecessarily extravagant price, places them beyond the reach of any but persons in easy circumstances. Those who cannot afford this luxury must use a colored glass or a one-eye shade. It should not be covered with a patch, because it would cause inflammation. When enamel eyes have lost their polish, and begin to roughen, they should be no longer used, else, unpleasant consequences may follow. Strict regard to cleanliness should be observed, and the eye should be removed as often as once in twelve hours.

Enamel eyes a luxury.

Should not be worn when defaced.

Hearing.

Fig. I.*

CHAPTER I.

INTRODUCTORY.

There is in souls a sympathy with sounds,
And as the mind is pitch'd, the ear is pleas'd.

THE EAR affords one of the means by which the mind communicates with external objects. Through this channel man communicates with his

* The above diagram exhibits, No. 1 (the external ear); No. 2, the canal leading to the drum; No. 3 is an exhibition of the exterior of the cochlea and semi-circular canals.

fellow-man. Through it the music of nature affords delight, and the mind is influenced by the sublime sounds that proceed from the thunder-cloud and the rolling ocean. Providence has provided that there shall be much in the world to afford delight to this sense. If the forests are green, that they may present a picture pleasing and grateful to the eye, its branches are filled with melodious songsters to ravish the ear. If the earth is covered with a green carpet, that it may be delightful to the eye, the same Omniscient goodness has caused from the herbage to come up various sounds to cheer and enliven this otherwise solitary earth. The sound of the cricket by the hearth-stone, or the grasshopper in the field, which tells of spring-time and summer, or the frog croaking in the marsh, or the katydid in the tall trees, which whispers of an advancing season, and an approaching autumn, are among the melodies of nature, which revive old associations, and awaken the mind to thoughtful and grateful remembrances. Through the ear, the mind is awakened to new aspirations and incited to noble aims. Music, from the infant lullaby up to the period when the last sense

Use of the ear.

Delight which it affords.

Music.

is blunted, has ever possessed the power to ravish every class of minds, every order of intellect; awakening it to enthusiasm, arousing it to the performance of the most daring deeds, exciting the most tranquil emotions, leading the mind to religious contemplation, and soothing the dying pillow. Its power extends to most of the animal creation, and perhaps all are accustomed to some sounds, which afford them melodious delight. All this and more is afforded by means of the ear, contributing, in a high degree, to make the period of man's probation useful and happy.

Eye and ear intimately related.

There is between the eye and the ear, necessarily, an intimate association. They relate so closely to each other, that one can hardly be considered without regarding these relations. In the acquisition of knowledge, in the engagements of business, and in all the pursuits of life, they furnish jointly the means by which knowledge is acquired and success secured.

Those diseases to which one organ is subject, are frequently found existing in the other; and, to an eminent degree, in diseased conditions they sympathize with each other.

It is common to undervalue this organ in com-

Ear undervalued.

parison with the eye. When it is recollected that its loss involves not only exclusion from sounds, from voices, and from music, but also the total interruption of the ordinary means of communication with our fellow-men—of the inestimable privilege of speech, it is very hard to draw comparison, or in the contemplation to find a choice of evils.*

Effects of loss of hearing.

In appearance, the ear has less attractiveness than the eye. Its structure is less understood. Philosophical truths cannot readily be employed to furnish an explanation of the manner in which its functions are performed. The ear, moreover, is less liable to abuse, and can scarcely be injured by overuse. Still, most diseases and derangements of this organ could be prevented but for a want of care and attention to the *earliest symptoms.* Most of the chronic derangements of the ear which produce permanent impairment of this sense are caused by *inflammation at the commencement.* Frequently, the ordinary

Disease—how prevented.

* The reader is referred to Chapter VI. for some very interesting facts on this subject, which, if they do not induce him to regard the ear the most important organ, he will not esteem the least.

indications of inflammation are scarcely observable, notwithstanding the progress of diseases is constant and certain. If matter is collected in or about the ear, owing to its confinement in a bony cavity, where the parts cannot yield to pressure, pain is frequently intense. But that form of inflammation to which the ear is most subject, is insidious, and is rather evidenced by functional derangement than by pain or uneasiness. There are peculiar difficulties attending the perfect understanding and successful treatment of diseases of the ear, which do not obtain with regard to diseases of the eye.

Difficulties with regard to the investigation of diseases of the ear.

This difficulty arises partly from the want of facility of observation, and the impossibility of observing the ear while in the performance of its functions. The apathy of the public, with regard to this subject, which induces them not to seek advice in the incipiency of disease, and to attach less value to the organ than it deserves, has failed to stimulate medical inquiry, and prevents the patient from receiving assistance at that point of time when it would most avail. Persons who suffer a slight inconvenience

Carelessness on the subject.

with regard to any other function or organ of sense, manifest an incredible unconsciousness of the approach of deafness—perhaps to the extent of the loss of hearing on one side. When months, or even years have elapsed, perhaps, they awake to a sense of their loss. When asked why they did not attend to it sooner, the answer is, perhaps, that they "did not like to be tampering with their ears;" that they were "afraid they would be made worse;" or, that somebody said that "nothing could be done." Probably diseases of the ear may be just as scientifically treated, and as surely relieved, as any other class of human maladies.

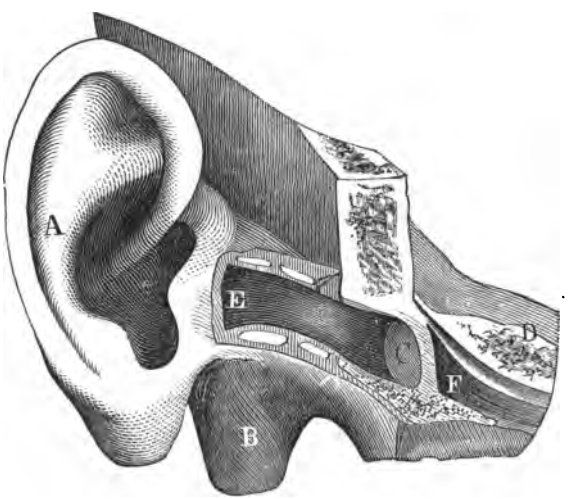
Reasons for neglect.

CHAPTER II.

THE STRUCTURE OF THE EAR, AND ITS FUNCTIONS.

"What a piece of work is man."

Fig. II.*



External ear.

THE human ear—that portion of it which is conspicuous—considered separately from the body, is one of the most beautiful

* In the diagram at the head of this chapter, will be observed the external ear A. The canal leading to the drum E. This canal is winding, and usually from

objects in nature. Its convoluted folds, its concentric circles, its evident adaptedness to collect the sounds and direct them into the ear, renders it, to the reflecting mind, an object of great interest. When we enter its interior structure, and observe the canal through which the sounds pass, guarded by its peculiar defences, terminating in a thin, expanded surface, wonderfully adapted to receive the sounds, and communicate the impression which they produce, our wonder increases.

Canal.

Drum.

This is as far as the eye can penetrate into the ear of the living subject; indeed, it requires some tact, and, ordinarily, the aid of an instrument, to look so far. To the beholder, all this affords but a slight indication of the delicate and important

1¼ to 1½ inches long. C marks the position of the drum and its anterior surface, and F the Eustachian tube, which communicates with the mouth and nose, through which air passes into the ear. Idle people sometimes amuse themselves by drawing smoke into the mouth, and expelling it through this passage out of the ears. Looking over a congregation who are listening intently, many of them will be observed to have their mouths open, in order that they may hear more perfectly. The reason is, that the vibrations of air are improved by its more ready transmission through this canal. The bony receptacle for the organ, which is represented as sawn asunder, is indicated by the representation of a roughened surface on either side of the canal and tube, at D. B marks the bony projection which the reader may readily feel behind and beneath the external ear.

Eustachian tube; or canal from the nose to the ear.

office-work which these organs perform. He sees only a cartilaginous appendage upon the side of the head, and an uninteresting hole, filled with hairs and wax. The very wax and hair which produce this unsightliness perform an important and indispensable duty in keeping the surface of the canal in a healthy condition, and preventing foreign substances from rolling into it. With regard to the external ear, it is an interesting fact that most animals, except man, have the power of moving it, so as to adapt itself to the direction of sounds. Persons are occasionally to be met who have the same facility to a limited degree. This power is enjoyed to a greater degree in the savage than in the civilized state. To obviate, perhaps, this lack of facility, persons are observed to place the open palm in front of the ear, in order to assist it in catching the sounds.

Hair and wax.

Power of moving the ear.

Accepting the aid of the anatomist's knife and saw, we enter the hard, bony case in which nature has placed this essential and complicated organ. Here we find mechanism more wonderful, more intricate, and more incomprehensible, than anything which we have before

Internal structure.

observed. Hitherto we have reached nothing really necessary to the performance of the function of hearing, the drum merely serving the purpose of producing unison, and increasing the strength of sounds. We next come to that portion of the ear which serves the purpose of perfecting the hearing, called the labyrinth. It consists of what is called the semi-circular canals and the cochlea, from its resemblance to the shell of a snail. The labyrinth is filled with transparent fluid, and membranes, and bony canals. "The vestibule," so called, is, however, the essential and fundamental part of the ear. It is composed of a membraneous sack. It contains an alkaline fluid; indeed, several fluids are described by minute anatomists. A tube communicates between the ear and the back part of the mouth and the hollow cavities beneath and about the forehead, thereby admitting air, which serves to keep the membranes in a state of tension, securing an increased vibratory medium, and perhaps materially assisting the function of hearing. It is liable to the same kind of diseases as the rest of the apparatus, and is relieved to some extent by the same kind of treatment.

This very superficial glance at the structure of

the organ only serves to indicate that there is a great deal to observe, and that it affords an extensive field for study and investigation. The general reader should not be content without knowing something of the structure of the ear, and of the principles upon which its functions are performed. The ears of animals, from the elephant down to the tiniest fish, have afforded interesting subjects for scientific investigation. They give evidence of every variety of organization. Insects, the bee for example, are supposed to have no organs of hearing, but only an exquisite sense of feeling; that the sonorous vibrations of the atmosphere produced by their incessant buzzing, and the discordant sounds of the kettle in swarming them, act upon their delicate organs of touch, while their little antennæ, crossing each other in various ways furnishes a mode of communication. The size, shape and direction of the outer ear of animals depends much upon their peculiar habits and character. For example, in the timid who are pursued, as the hare and rabbit, the structure is particularly developed—is inclined backwards toward the direction from which the sound

Insects.

Bees.

Rabbits.

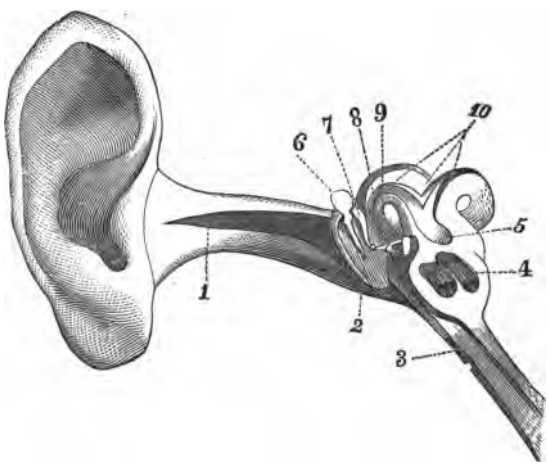
of the pursuer proceeds, and may be laid upon the head and neck, so as not to impede its flight. In pursuing animals the ear is small, and is directed forward. Those who run through thickets have the ears protected in a peculiar manner. The ear becomes pendulous in proportion to the domestication of the animal. This will be seen by comparing the tame and wild of the same species, as the dog, sheep, rabbit, &c.

The intricate portions of the ear are little understood. Anatomists and physiologists have endeavored to cover their ignorance by giving many hard names to the more complicated parts of the ear, the purposes of which are not understood. The "labyrinth" of the ear has proved a place where authors have groped in the dark for many years; and I have no idea of introducing my reader, whither he cannot extricate himself without profitless bewilderment. Figure III., on the next page, furnishes some idea of the form of the internal ear, and of the manner in which it is connected by the canal with the external ear.

In order to convey a more definite impression with regard to the uses to which these several parts are adapted, the following quotation is intro-

duced, from the well-known and celebrated work of Dr. Paley: "The organ of hearing consists in an external ear; is calculated, like an ear-trumpet, to catch and collect the pulses of air in large

Fig. III.



EXPLANATION.—The external ear is again exhibited. No. 1 points out the canal leading to the drum. No. 2, the inner surface of the tympanum or drum. No. 3, the eustachian tube. No. 4, the cochlea. No. 5, the vestibule. No. 6, the malleus, one of the four little bones, which together are termed the ossicula, which hinge on to each other, and materially assist the function of hearing. No. 7, the incus, another of these little bones. No. 8, the os obiculare. No. 9, the stapes. This is named from its resemblance to a stirrup, and is the last of that little group of bones. No. 10, and the lines leading from it, indicate the position of the semicircular canals.

quadrupeds, turning to the sound and possessing a configuration, as well as motion, evidently fitted for the office; of a tube which leads into the head, lying at the root of this outward ear, the folds and sinuses thereof tending and conducting the air towards it; of a thin membrane, like the pelt of a drum, stretched across this passage upon a bony rim; of a chain of movable, and infinitely curious bones, forming a communication, and the only communication that can be observed, between the membrane last mentioned, and the interior channels and recesses of the skull; of cavities, similar in shape and form to wind instruments of music, being spiral or portions of circles; of the eustachian tube, like the hole in a drum, to let the air pass freely into and out of the barrel of the ear, as the covering membrane vibrates, or as the temperature may be altered; the whole labyrinth hewn out of a rock; that is, wrought into the substance of the hardest bone in the body. This assemblage of collected parts constitutes together an apparatus, plainly enough relative to the transmission of sound, or of the impulses received from sound, and only to be lamented in not being better understood.

The communication within, formed by the small

bones of the ear, is, to look upon, more like what we are accustomed to call machinery than anything I am acquainted with in animal bodies. It seems evidently designed to continue towards the sensorium the tremulous motions which are excited in the "membrane of the tympanum," or what is better known by the name of the "drum of the ear." The compages of bones consists of four, which are so disposed, and so hinge upon one another as that, if the membrane, the drum of the ear, vibrate, all the four parts are put in motion together; and, by the result of their action, work the base of that which is the last in the series upon an aperture which it closes, and upon which it plays, and which aperture opens into the tortuous canals that lead to the brain. This last bone of the four is called the stapes. The office of the drum of the ear is to spread out an extended surface, capable of receiving the impressions of sound, and of being put by them into a state of vibration. The office of the stapes is to repeat these vibrations. It is a repeating frigate, stationed more within the line. From which account of its action may be understood, how the sensation of sound will be excited by anything which communicates a

vibratory motion to the stapes, though not, as in all ordinary cases, through the intervention of the membrana tympani. This is done by solid bodies applied to the bones of the skull, as by a metal bar held at one end between the teeth, and touching at the other end a tremulous body. It likewise appears to be done, in a considerable degree, by the air itself, even when this membrane, the drum of the ear, is greatly damaged. Either in the natural or preternatural state of the organ, the use of the chain of bones is to propagate the impulse in a direction towards the brain, and to propagate it with the advantage of a lever; which advantage consists in increasing the force and strength of the vibration, and at the same time diminishing the space through which it oscillates; both of which changes may augment or facilitate the still deeper action of the auditory nerves.

The benefit of the eustachian tube of the organ, may be made out upon known pneumatic principles. Behind the drum of the ear is a second cavity or barrel, called the tympanum. The eustachian tube is a slender pipe, but sufficient for the passage of air, leading from this cavity to the back part of the mouth. Now it would not have done

to have had a vacuum in this cavity; for, in that case, the pressure of the atmosphere from without would have burst the membrane which covered it. Nor would it have done to have filled the cavity with lymph or any other secretion; which would necessarily have obstructed both the vibration of the membrane, and the play of the small bones. Nor, lastly, would it have done to have occupied the space with confined air, because the expansion of that air by heat, or its contraction by cold, would have distended or relaxed the covering membrane, in a degree inconsistent with the purpose which it was designed to execute. The only remaining expedient, and that which the eustachian tube serves, is to open to this cavity a communication with the external air. In one word; it exactly answers the purpose of a hole in a drum.

The membrana tympani itself, likewise, deserves all the examination which can be made of it. * * * It bears an obvious resemblance to the head of a drum, from which it takes its name. It resembles also a drum-head in this principal property, that its use depends upon its tension. This is provided for by the end of a bone, one end of

the malleus pressing upon its centre. Says M. Everard Home: "This mode of adapting the ear to different sounds, is one of the most beautiful applications of muscles in the body; the mechanism is so simple, and the variety of the effects so great." The internal mechanism of the ear is so intricate and delicate that it requires to be covered from the external air; yet, says Paley, "had the Author of nature shut it up by any other cover than what was capable, by its texture, of receiving vibrations from the sound, and, by its connection with the interior parts, of transmitting those vibrations to the brain, the use of the organ, so far as we can judge, must have been entirely obstructed."*

Comparison between the ear and eye.

Although the eye and the ear are so different in their situation and structure, there is much that is common to both. Each occupies its own bony receptacle—that which covers the ear being the hardest, because of its more exposed situation. Hairs protect the approaches to both. Fluids and delicate membranes constitute the media, by means of which the respective functions of each are performed. Muscles, cartilages, and fatty tissue are associated

* See Note A.

in the structure of each; and the same mysterious canals and passages are essential to their perfectness. The same membrane which covers the eye, and is reflected upon the inner side of the lids, is found everywhere in the interior structure of the ear.

In the ear, as well as the eye, impressions upon the sensory nerve are made through a medium capable of transmitting them. Our ideas of the nature, intensity, and direction of sound are obtained from the effects of these sounds upon the delicate, nervous structure. This complicated organ in our own species is intended to attain greater discrimination in sounds than is possessed by the lower orders. Much research has been employed, and many experiments, in order fully to explain the functions of the particular parts of this most complicated structure; nevertheless, it is imperfectly understood.

The ear, as well as the eye, varies among different individuals, as regards general acuteness. This power may be greatly increased by practice. The savage hears the tread of a wolf, the cracking of a stick, or the click of a rifle, while his companion, unaccustomed to the

Difference in facility of hearing.

wilderness, hears no sound. Some possess naturally the power of hearing very faint sounds. Others, again, have what is called a musical ear. From very infancy, they appreciate every musical sound; and for them, nature is filled with charming melodies. As they advance in years, they readily learn musical combinations. This sometimes proves a fatal facility, amounting to a passion over-riding all other desires, and preventing proper attention to the necessary engagements of life. To some it is a source of positive discomfort, because every discordant sound is intolerant. To many persons this power is a thing unknown, and they find but little delight in those melodies which ravish the ear of their more fortunate neighbors. The power of distinguishing the direction of sounds is acquired by habit. It requires some time for the infant to know anything of the direction of those sounds which attract his attention. The ear of the child, moreover, is not sensitive. That noises which distract the adult afford delight to juveniles, is a fact, with regard to which, all have some painful experience. The distance of objects is also an

Musical ears.

Direction of sound.

Child's ears not sensitive.

acquired sense. Indeed, in the due performance of their functions, education and experience have much to do, as well with the ear as the eye.

Many curious examples are related of functional derangement during disease. Under certain diseases of the nervous system, old associations are revived, and the voices of friends long dead are heard. The sound of bells, of cannon, and other noises, fall upon the ear with all the distinctness of reality. Derangements of function.

There is an almost distinct variation in the *extent* of deafness usually met with, from the slightest, scarcely perceptible deficiency, to the total loss of function. The amount of deafness does not always bear relation to the extent of disease. As remarked before, there is a great difference in the capability of hearing different sounds; thus, one who was incapable of hearing a watch, when applied to his ear, rarely lost a word in ordinary conversation. Another could hear the watch, but was incapable of hearing the voice, though raised to a considerable pitch. Musical performers have been known sometimes to hear perfectly certain notes, while they failed to hear others, or they heard Extent of deafness. Difference in capability.

them in a manner that produced discord. For example, an amateur performer on the flute heard the flat notes as naturals; thus, the tune which was harmony to him, was discord to others.

CHAPTER III.

CURABILITY OF DISEASES OF THE EAR, AND POPULAR OPINIONS AND PRACTICES.

"Stole
With juice of cursed hebenon in a vial,
And in the porches of the ears did pour
The leperous distillment."

"OBSTA PRINCIPIIS," which indicates the necessity of avoiding the beginnings of disease, which is placed upon the title page, involves, if possible, a more important principle in relation to diseases of the ear than the eye.

There is a point of time in the history of most cases of deafness, when a cure could be effected. This is, however, at the very commencement, when ordinarily, the derangement hardly arrests the attention. In competent hands, if advice is sought early, diseases of the ear may be as well

Curability.

understood, and as generally cured, as those of any other organ in the body. Deafness is so common and distressing an infirmity, and often so incurable, that persons should be encouraged to seek relief in slight ailments during the period of the incipiency of disease, instead of letting them go on till past recovery, and then seek advice from ignorant and mercenary quacks.

Says an eminent writer of great experience: "We daily hear and read, and it has been frequently reiterated, that the treatment of deafness is an opprobium to the healing art—that it is without the pale of human knowledge. Now, notwithstanding the injudicious treatment by quacks and nostrum-mongers, the neglect of patients, and the abandonment of treatment by the general practitioner, still, were the statistics of all diseases carefully collected, it would be found that there were among them as many curable cases of affections of the ear, as there are among the severe maladies of the eye, or among diseases of the chest, the brain, the liver, or any other organ."

The reason why the rapid improvements of the

science have been less, perhaps, in this direction, is found in the smaller share of sympathy afforded to the deaf than to the blind; impairment of the hearing interfering less with man's means of sustenance; and, moreover, in the great difficulty of examining during life, and of investigating after death, the morbid changes which occur in the internal ear. Says the writer before alluded to: "I am convinced that the instances of deafness are very few, which were not the result of some of the different forms of inflammation; and I have been led to pay particular attention to those diseases in the early stages, the only period at which, in most of them, art can be of any avail." It is very recently that any reliable statistics of diseases of the ear have been published. It is well remarked by another, in relation to statistical calculations, that "they remind one of the kaleidoscope, which, when turned or shaken, presents new and beautiful combinations of figure and color, irrespective of the objects which produced such, being crooked pins, or glass beads, spangles, or diamonds." It is less than ten years since statistics on this subject began to be collected to

Origin of deafness.

Statistics.

any considerable degree; and they are not yet entirely to be relied upon. A record of one thousand cases, by an eminent author, and four hundred by another equally reliable, in the large hospitals in Europe, devoted to this class of disease, exhibits a fair proportion of cases, in which a favorable result has been accomplished. In concluding the report, the author says that "inflammatory affections of some kind have been the chief cause." He moreover adds, that his researches have convinced him, not only of "the inapplicability of the various nostrums still in use for deafness, while on the other hand, it holds out a fair hope of alleviating diseases of the the ear, if taken in time."

Popular opinions.

As was remarked in relation to diseases of the eye, popular opinions were, for the most part, once held by the profession, which forgets, while from father to son, from age to age are passed along the absurd dogmas of antiquity. That branch of the healing art which relates to the ear is but just emerging from a period of darkness, ignorance, empiricism, prejudice and superstition. Hippocrates regards deafness as a single disease, and recommends cleansing it with wool, dropping in oil, rising up early, drinking white wine, and

abstaining from fish that inhabit rocky shores. Celsus and Galen complicated the subject by the introduction of hard names and improbable fanciful conjectures. They extolled as panaceas, castor, ox-gall, frankincense, garlic, opium, nitre, alum, hellebore, and an hundred other absurd remedies. Even early in the present century, a quack in London advertised the following remedies, and was said to have been extensively patronized. He honestly professed, however, to have obtained them from antiquated authorities. The galls of all animals, birds, and fishes; the milk of nearly every animal; the sap of many trees, extracted by placing one end in the fire; the fat or marrow of birds, beasts, and fishes, oil of all kinds, both animal and vegetable; liquid extracted by bruising ants and wood-lice; the liquid obtained from the putrefaction of earth-worms; salt, and nitre." A licentiate of the college of physicians in London, pretended to have obtained a supply of water from the pool of Bethesda, in the sheep-market, in the city of Jerusalem, and that, though in bottles, it was troubled once a month by the angel of the Lord. He advertised that this remedy would cure all complaints, if taken

Antiquated notions.

Quackery.

in proper doses—for deafness it was to be applied externally, with the ointment of cabbage-stalk, which the doctor introduced into the ear himself thrice a week. It is true, the college of physicians suspended him for his quackery. This ointment was found to be composed of mercury, and the fluid to be mere salt and water. Notwithstanding his successes in a pecuniary line, the medical society, unlike our own in New Jersey, had power and influence sufficient to silence him, and relieve the credulous public from the injury that he was found to be constantly inflicting.

Except with regard to the anatomy of the ear, which was very patiently studied, and very perfectly understood, in the eighteenth century, it was not until well into the present century that any very considerable advance was made in the appreciation of disease, and the methods of cure. Even to the present hour, there remains much of the credulity of the past in the opinions held, and the practices resorted to. It is interesting and amusing to observe the practice which obtains to all sciences, of multiplying terms and furnishing expressions complicated and difficult, about in proportion to the want of knowledge which is mani-

Credulity.

fested in regard to them. Thus the tyro in law, physics and theology loves to astonish with his hard names, which, instead of furnishing evidence of learning, frequently afford the best assurance of the want of it. For example, Galen, in his list of diseases of the ear, enumerates five prominent symptoms, and calls them each separate diseases, under the sonorous epithets of Otalgia, Baruckoia, Kopholis, Parakousis, and Parakousmata. To the ear as well as to the eye it is popular to apply all sorts of incongruous remedies, and many of the worst possible character. Essential oils, stimulating liniments, turpentine, creosote, tincture of Spanish flies, are frequently poured into the ear; while outside are applied roasted onions, boiled figs, fat bacon, cologne water, alcohol, &c.

Medical terms.

This useful and important organ is treated very much like the horse when ailing. Everybody is thought fit to prescribe, and no remedy is regarded too incongruous or absurd to be employed. There is an old popular superstition, which is said to be still resorted to; that wool procured from the left fore-foot of a six year old black ram, has very astonishing curative virtue.

Superstition.

In this meridian it is fashionable to substitute for the wool, the cotton-plant. Scarcely a single case comes under my notice, but when about to make the examination, I hear the remark, "Wait a moment till I take this cotton out of my ears. I put it there to keep the cold out." There is a rare condition of great sensitiveness, when it would be proper to modify the intensity of the sound; but it is seldom advisable, and very frequently injurious thus to stuff up the external ear. The evils of the practice I shall point out more particularly a little farther on. When employed to prevent the running out of discharges which are accumulating in the ear, it is an evil, and increases the difficulty which it was intended to relieve.

Stuffing the ear.

No popular practice, as has been before intimated, so embarrasses the surgeon, and so often contributes to permanent deafness, as that of procrastination—the postponement of application for relief, to the period when the disease is confirmed. The accounts which even educated people give of the history of their deafness, are incongruous and embarrassing, and the marvellous apathy and indifference with regard to the

Procrastination.

insidious approaches of disease, somehow or other obtains in all ranks of life. Few are aware that hearing may be impaired by a variety of causes. The approach of deafness is insidious and painless. So imperceptibly is the faculty lost, that friends often discover it before the patient himself.

Approach of deafness painless.

Where valuable time has thus been wasted, the next period of time, also invaluable, is often wasted upon quacks or quack remedies, which ever abound. Just in proportion as a disease is regarded incurable, in the same proportion are there found those who promise speedy and certain relief. Thus, if the advertisements could be credited, none ever need die even of hydrophobia, locked jaw, epilepsy, or cholera; nor need any suffer pain a single hour, if they have but a dollar to pay for the panacea. The want of knowledge on the part of the regular practitioner on the subject of diseases of the ear, was taken advantage of in a previous age by quacks and nostrum-mongers, and by electro-galvanic and magnetic doctors. Metallic tractors, secret and never-failing acoustic drops, stimulating embrocations, fanciful trumpets, and many more impostures were pawned upon the pub-

Quackery.

lic by men who had the ingenuity and effrontery to make money in this fashion. The quackeries of the present age are no less bold and successful. While human nature is constituted as at present, the man who has the address, and the lack of conscience to promise cures, and the ingenuity necessary for success, will always find plenty of patrons. In many minds there seems to be an innate, overruling objection to the scientific physician, who has spent the best years of his life acquiring his profession, and a decided preference for him who has obtained it by intuition, or has sprung upon some secret, unusual cure. The discovery of imposture in a particular instance, does not affect their confidence. Thus, the inventors of quack panaceas, pills, and mixtures, build marble palaces and amass great wealth; while the man of science must be content with, at the utmost, a competence. The following quotation upon this subject from a new work by an Irish aurist, will be recognized as containing truths adapted to our meridian: "Let any well-educated, honest practitioner be called on to treat an urgent and alarmingly dangerous case, where insidious death stands at the sick man's door—let him bring all the acquirements of long

years of patient study and observation of disease—his anatomical and pathological knowledge—an eye practised to disease, and a head stored with the sound, rational, scientific, practical principles of his art—let him add to this the kindness of a friend, nay, often the benevolence of a benefactor—let him pass anxious days and sleepless nights, watching each turn of disease in his patient, and ministering to every one of the many wants that attend the bed of lingering sickness—let him do all this, and finally (under Providence) restore the patient to health and to his friends—stand, as we may say, between the living and the dead; beckon back the approaching king of terrors, and give again to society a valuable life, and to the trembling, anxious family their only earthly means of support—what is his reward? He is, generally at least, paid his fee, and the patient and his friends are generous enough to say they feel grateful for all his kind attention, for we will not curtail it of whatever good feeling may be shown on the occasion. But compare this with a patient who imagines he is cured of an imaginary disease by a water-doctor, or an atom-doctor, an electro-biologist, a mesmerizer, or a magnetizer—is he not immediately con-

verted into a partisan? Does he not become a missionary for the nostrum-monger? Does he not go about from house to house detailing the miracle of his cure, the skill of the doctor, the horrors of the regular practitioner, and the great benefit conferred upon mankind by being converted into hydraulic machines; or expressing his surprise that people will go about their ordinary business, 'clothed, and in their right minds,' like the man from whom the seven devils were cast out, instead of being wrapped in a wet sheet, or enjoying a sitz-bath for ten hours a day; while others will wait upon you specially, to beg and entreat you will not convert your poor stomach into an apothecary's shop by taking all that "doctor's stuff," instead of procuring rest and ease to all your ills, by just such an anodyne as would be formed by pouring one drop of laudanum into the Bosphorus, where it leaves the Euxine, and drinking a thimble-full of the same water where it enters into the Mediterranean! But, not content with this, these medical missionaries abuse all regular practitioners, and often force (for humanity's sake, as they say), the charlatan upon the patient, who then trusts to his address for future fame and profit."

The practice of stuffing the ear with cotton, before alluded to, fills a passage into which nature intends that atmospheric air should enter—prevents the formation of wax, and ultimately increases its calibre. An eminent surgeon recently related to me a case, in which the distension was so great from this cause, as to admit the introduction of the thumb. Besides, the cotton often passes in, and remains for a considerable time, producing the most distressing symptoms, and serious deafness. I lately relieved a case of deafness of several years' standing, by removing a plug of cotton which was resting upon the drum; the filaments of cotton having gradually united with the wax, in consequence of its continued use. It might as well be placed under the lid of the eye.

Stuffing cotton in the ear.

The practice of probing the ear produces serious injury. Among the furniture for the pocket there is a little probe, to the other end of which is arranged a pair of tweezers. This harmless-looking little shovel has done great mischief. The surgeon accustomed to diseases of the ear, will scarcely dare to do any probing. If he introduces an instrument at all, he does it with the utmost caution, usually to remove something

Probing.

already loosened. No part of the human body is more sensitive than the covering to the ear-passages. It is never proper for persons to poke their ears with probes and pins. While writing this paragraph, I have under my care a case of serious inflammation, produced by poking the canal to relieve a tickling sensation. With regard to the use of pins, the head may come off, and become entangled with the wax, and lie upon the drum, producing distress and serious derangement of function—such cases have occurred.

Pins in the ear.

Squirting water into the ear with those little ear-syringes (so-called) is a bad practice. If syringing is required, the instrument ordinarily used would be utterly ineffectual. If syringing is not required, it would be useless. Besides, without a proper understanding with regard to the direction of the canal, its most delicate inner lining is almost certain to be injured by the point of the instrument. To syringe the ear properly and effectually, is not as simple an operation as it appears: it requires care, tact, and the proper instrument, and should not be resorted to without medical advice, or performed except by

Syringes.

the surgeon himself. The practice of putting laudanum, brandy, and various oils and other substances, often the most incongruous—salt pork for example—into the ear, cannot be too strongly condemned. If any oily matter is employed, which, under some circumstances, may be advisable, the greatest care must be taken with regard to its utmost purity, and it should be used under immediate advisement.

Putting drops in the ear.

Foreign bodies are apt to get into the ears, particularly of children. Under certain circumstances, insects find their lodgment in the ear, producing much distress, and very great mental disquietude. Beans, peas, buttons, grains of corn, pebbles, bits of slate-pencils, cherry-stones, paper balls, and beads, are all liable to find their way into the ear. They do usually less mischief than is done by the rude attempts to dislodge them. In such a case, it is better at once to apply to a competent physician. If such is not available, on no account should an instrument be introduced without the most careful examination. Unless it can be seized by a pair of forceps, without any danger of causing it to pene-

Foreign bodies in the ear.

trate further, a little warm water and a syringe is the proper means to be employed; this will either dislodge it or turn it in a new position, so that it can be removed. With regard to the fly or smaller bodies, no other remedy is ever proper. It is customary to poke around in the dark, regarding this delicate organ as a mere hole, which is not liable to injury from such manipulations. Indurated wax, if it is certain that it is the cause of deafness, can seldom be removed successfully, and never safely, in the manner which is popularly resorted to. It should never be dug out, and the washing out with a syringe is far less simple than it appears.

Flies and bugs in the ear.

Hardened wax.

CHAPTER IV.

DISEASES TO WHICH THE EAR IS SUBJECT.

"This way the noise was, if mine ear be true."

THE external ear is liable to blows, and wounds, and injury from the sting of bees, and is often the favorite point for the commencement of erysipelas. Allusion has been made to hardened wax, and the introduction of foreign substances into the ear. There is a common impression that piercing the ears is a sanitary measure —that it will relieve affections of the eye and other evils. This practice and this impression seem to be common to some extent among all nations. It is valueless as a curative process, and though so simple an operation, is not always unattended by evil consequences. The most frightful inflammations have occasionally been the result. Pulling

Piercing the ears.

children's ears, or boxing them severely, undoubtedly conduce sometimes to inflammatory affections of the organ. The skin of the external ear is extremely sensitive. The popular belief on this subject is indicated by very many trite adages. One is spoken of as "blushing to the ears;" and a heated feeling about this organ is regarded as an indication of the expression elsewhere of good or evil concerning the party. This organ has played an important part in ages past, in the administration of judicial punishments. Thus, under the Mosaic law, a servant manifested his affection for his master by permitting his ear to be thrust through with an awl. Cropping the ears was resorted to in the time of the civil wars in England. In Cairo, the baker was nailed by the ear to his own door for selling bread below the standard weight, and elevated so that his toes could scarcely touch the earth. Nailing the ear to the pump, slitting it, and cutting it off, were among the cruel punishments of other days. Inflammation accompanied with catarrh is a frequent disease of youth and early life. There is said to be "a cold in the head;" there is

Antiquity of cutting the ears.

Influenza and catarrh.

a singing or buzzing in the ears, and partial deafness; upon coughing, sneezing, or blowing the nose, there is a feeling as if something "cracked or gave way in the head." This frequently attacks children at school, and when connected with a scrofulous habit, is sometimes a very serious disease, and lays the foundation of deafness during future years. The deafness is frequently attributed to inattention, and the time is allowed to pass by when it could have been advantageously treated. The friends of the patient excuse themselves by saying, "We thought it was only a cold and would not signify." This disease usually occurs between the ages of five and fifteen years. It is most common among the light-haired, fair-skinned, and blue-eyed children. There is but little pain; and perhaps the only prominent symptom is a hardness of hearing. Adults are frequently attacked in this manner. During a prevailing influenza these cases are likely to occur, and unless relieved, eventuate in permanent deafness.

A disease common to children.

This condition of things may result in a discharge from the ear. A discharge from the ear is most frequently the pro-

Discharges.

minent symptom of disease of the ear. Its continuance is owing generally to a scrofulous habit and culpable neglect. This is a disease of infancy and youth. It is a result of several diseases, and often eventuates in deafness. If it occurs in middle life, it will be usually found not to be of recent date. The discharge sometimes commences without pain, if in an infant or youth; the first indication being frequently a slight soil upon the pillow; if a grown person, the introduction of the finger, or the end of the pocket-handkerchief, detects a slight moisture. Soon an unpleasant smell is perceived, and, subsequently, dullness of hearing occurs. The ear is now crammed with wool, or cotton, perhaps roasted onion or fig is applied, and diligent inquiry is made among the neighbors to learn "what's good for it." If professional advice is sought for a child, the parents are sometimes told "to make themselves easy about it;" that it is a constitutional affection; that it will wear off; that it is not advisable to check the discharge," and to employ sea-bathing and strengthening remedies. Notwithstanding, the disease usually does continue, sometimes for a considerable period, without much

Progress of the disease.

increase or diminution of the discharge; but frequently it increases, becomes thick and ropy, of a yellow color, sometimes little, and sometimes much; at length it becomes thin, sometimes white and flaky, saturating the pillow at night, emitting a fetid smell, and the ear presenting a disgusting appearance. The disease, in some cases, extends itself to the intricate, bony structure of the ear, destroying the organ, producing incurable deafness, of course, and is sometimes succeeded by paralysis of that side of the head, with a sinking of the general health. In some cases, disease of the brain supervenes, terminating the life of the patient. All these may result from what is regarded as only a slight running from the ear. It is a standing wonder how sensible people can pass along through life with such a loathsome disease about them. It would be supposed that the unpleasant smell—if there was not much ringing or deafness, and the disease did not make sensible progress—would induce resort to means of cure. Many endeavor to conceal the affection, and others permit foolish prejudices to prevent their seeking competent advice. As has been before

Effects of the discharge.

Chronic discharges.

said, a scrofulous constitution usually furnishes the exciting cause of discharges from the ear. They frequently occur after scarlet fever, measles, small-pox; or, indeed, fevers of any description, or long sicknesses may produce it. In infancy, over-feeding, or insufficient diet, or the introduction of foreign bodies into the ear, or improper use of the syringe, or earpick, may prove exciting causes. Cold bathing is a frequent cause of this disease. It seems frequently to date from some plunge made into the river during the boyhood of the patient. In all these cases, when left to "outgrow it," the expectation is sometimes realized, but often with total loss of hearing on the side affected. *There is no more difficulty in arresting these discharges and effecting a cure, than in relieving any other curable disease.* One of the greatest difficulties, however, is the popular prejudice which it is necessary to encounter. This disease is not always curable; and the cure is always tedious, and sometimes difficult. It requires care and attention on the the part of the surgeon and the parent, and these attentions must be protracted and assiduous.

Discharges curable.

I have very seldom failed, when I could secure

these attentions, and sufficient patience. This, moreover, is the experience of those who have seen a great deal more of the disease than I have. Sometimes a tumor forms, filling up the passage to the ear; and even then, there are parents who object to have this running stopped, from an absurd fear of dropsy of the brain, or some other evil. Some, even intelligent people, seem to think that somehow the discharge is "connected with the head," or that, if stopped, it will "go in upon the brain;" or that it is a "natural drain," and must not be suddenly dried up. It is possible that evil might result from doing this in an unscientific and improper manner; but if nature must have a drain, she had better have it at a point where she is not draining off, and destroying one of the most important organs of the body.

Patience necessary.

It would be quite as proper to refuse to cure a chronic or acute disease of the eyes. It is possible that checking the discharge suddenly might develop it in another place, but this only proves a diseased condition of the system. I cannot find the record of one single well-authenticated fact of disease of the brain, supervening upon checking a

discharge from the ear in a proper manner. As long as the discharge continues, no one can tell how, when, or where it will end, or what it will lead to.

Incipient deafness.

The common cause of many forms of deafness, usually regarded as unavoidable, because of hereditary antecedents, and and because their coming on has excited little attention, and is unattended by discharges—is a degree of inflammation at the point of beginning. Most patients speak of having taken cold—some uneasiness was felt—renewed attacks of cold are added to the severity of the symptoms—at length, the feelings of discomfort passed away—when advice was sought, there was found to be a deficiency of wax, and the drum was in an unhealthy condition. Out of two hundred recorded cases, in sixty-two cases the disease was attributed "to cold, or variations of temperature, by sitting opposite a broken window, or being exposed to a draft in a railroad car, or carriage, five to sea-bathing, and about thirty to the occurrence of irruptive fevers. A celebrated man,* who wrote very early in the present century,

* Saunders.

speaks of the sentiment which prevailed in his day among medical men, which, through them, was communicated to the public. He thought the absurd opinions on this subject were almost out-dated, but they seem to have been perpetuated in all their vigor to the present hour. His remarks on this subject are so pertinent, and his language is so plain, that I will quote from his chapter on this subject:

"Some practitioners are disposed to regard this as a trivial disease, others as one too dangerous to allow the interference of art. Both are in an error. It is, without doubt, a disease, destructive in its tendency to the faculty of hearing. It rarely stops until it has so much disorganized the tympanum and its contents, as to occasion total deafness. On this account, it demands the most judicious attempts to arrest its progress, and these attempts are free from danger. How the contrary opinion should have prevailed is unaccountable; yet many modern practitioners condemn all attempts to cure it. But what argument can be adduced against the cure of this disease, that is not equally conclusive against all others? Is any one an abettor of the

Discharges.

obsolete Humoral Pathology? He will contend that the stoppage of a drain which nature has established is pernicious, and the morbid matter will be determined on the internal parts; but how can such a person venture on the treatment of any disease, even the healing of a common ulcer? Some years ago I thought this absurd doctrine had been totally exploded, and yet I constantly hear it adduced to deter patients from interfering with this disease. Is a child the subject of it? The parent is told it is best to leave it to nature, and the child will outgrow it. Is it an adult? Some other subterfuge equally futile is employed. The truth is, the disease is always tedious and difficult, and not always curable, and many are disinclined to embarrass themselves with the case, who have not candor to make the true statement. Thus patients are induced to refrain from all attempts, until the disease, in its first stages often curable, becomes absolutely impracticable. Some physicians, even yet, hesitate to undertake the cure of chronic discharges from the ear, under some vague apprehension of serious consequences. If there be any foundation for these forebodings, it is time that they were furnished some definite catalogue of disorders which

may be regarded salutary, and protective." On the other hand—to use the language of another eminent English writer*—"if these apprehensions be not founded on truth, and cannot be justified by an appeal to facts, it is high time that so sorry a bugbear should be stripped of its terrors."

Says another author, speaking of this subject: "Some cases cannot be cured except after the lapse of time; and then the disease must be thoroughly understood, and the proper remedies employed at each stage of the disease. In consequence of the reluctance of some medical men, and the failure of others to cure—because the treatment is inapplicable or inadequate—people are induced to postpone application for relief, in expectation of a natural cure; and when they do apply, the opportunity is past."

This disease has three stages, and the result will depend, not only upon the treatment, but upon the stage in which the disease was encountered. As deafness differs in degree, so, when cured, the sense of hearing would be restored in different degrees. The sense of hearing cannot be rendered

* Harvey.

worse. If the discharge is stopped, the disease is removed, the organ is safe from further injury, and the patient is freed from an offensive malady. However, where there is complete destruction of the drum, in a few cases, the fluid serves as a medium by which the pulses of the air affect the seat of the nerve, and the hearing may be somewhat diminished. But in these cases, as in every other, it is unsafe to permit the disease to continue, for it will ultimately affect the brain. The want of this fluid may be readily and safely supplied by a drum of India rubber, or a bit of cotton. Many quacks make an impression upon the minds of their patients, by thus procuring them relief.

Effect of report from firearms.

Any loud report, such as a cannon, or a gun, or pistol, on a 4th of July, for example, very near the ear, has been known to cause temporary and even permanent deafness. There is sometimes produced by it, a rupture of the drum, or bleeding from the ear. Artillery recruits frequently suffer from bleeding from the ear. Says a surgeon of the Royal artillery, "Dulness of hearing is very common, especially among old gunners. The effect of position with reference to the gun is peculiar—those men who stand near-

est the muzzle feel the report most, but all who are to leeward suffer more than those to windward. Brass ordnance ring louder and make a sharper report than iron guns—the usual effect of which, as I have myself experienced, is that of receiving a smart blow upon the tympanum; this, however, soon passes off, and leaves a singing or tingling sensation in the ear for two or three days. Another peculiar sensation is that of having water in the ear, as if after bathing. After some practice the ear becomes accustomed to the shock, and men learn by experience where to stand so as to feel the concussion least." A medical practitioner in New England was standing half a dozen yards from a cannon, which was employed in firing a salute. At the instant of the firing he felt a severe shock in the ear nearest the gun, unattended by pain. He immediately perceived that he had suffered complete paralysis upon that side of the face. This state of things lasted several years. I have before me another case of a gentleman who was out shooting. His gun had been overcharged, and kicked so violently as to cause him to stagger. He felt a sharp pain in his ear, with immediate loss of hearing, from which he never recovered.

Distressing cases are recorded in which the germs of insects have been deposited in the ear, which afterwards became worms, or were developed in some other form, causing great distress, or even death. To sum up in a single sentence the causes of diseases of the ear, hereditary delicacy and susceptibility of frame, cutting teeth, or disorder of the digestive organs, may be regarded as the principal predisposing causes, while the exciting causes are, exposure to a current of cold air, plunging in cold water, or introduction of foreign bodies into the ear, accumulations of wax, irritating injections, irruptive diseases, and irruptive fevers of any kind, or attacks of catarrh or influenza. Sound in the ears is one of the most disagreeable symptoms in connection with derangement of this organ. The cause is not fully understood, but it is usually regarded a more important symptom than it really is. It is often one of the symptoms of dyspepsia, and occurs in connection with specks and motes before the eyes. It may, however, indicate serious disease of the brain, or of the nervous system. It occurs after excessive bleeding or typhus fever, and is a symptom of hysterics. It is, moreover,

Causes of disease of the ear.

produced by simple catarrh or wax in the ear. These sounds are mostly heard at night, when the patient lays down to rest; less in the open air, in a crowd, or when travelling in a carriage. The peculiar characters of the noises are as variable as the kind of circles, or beads, or threads, or balls, or sparks, which are seen before the eye in derangements of that organ. The description which patients give of the noises which they experience, depends to some degree upon their fancy, their graphic powers of explanation, and the associations by which they are surrounded. Patients from the country hear rushing or falling water, or the waving or rustling of trees, the buzzing of bees, or the singing of birds. Those in town hear rolling carriages, hammerings, singing or whistling like that of a steam-engine. Very often the sound is likened to that which is heard upon placing a conch-shell to the ear. Servants hear the ringing of bells, and an old Irishwoman said it sounded "as if all the kettles in Ireland were boiling in her ears." This annoying and distressing symptom, although often unimportant, should always induce the subject to seek medical advice. It may indicate the coming on of serious maladies.

Noises in the ear.

One of the most serious diseases, and that form which perhaps oftenest contributes to produce deafness, is rheumatic inflammation of the ear. The distinguishing symptoms of the disease is the "*tinnitus aurium*," or noises in the ear, a symptom which has afforded so much opportunity to quackery, because it never fails to excite alarm. It is indeed a symptom, in some cases, of great concernment—in others, of no importance whatever. Says an eminent English author,* "The public have been subjected to every variety of falsehood; their prejudices and prevailing weaknesses have all been worked upon to support any and every variety of quackery that has been proposed for the cure of this distressing malady; whilst the utter absence, on their part, of the necessary information, has left them without the smallest protection from imposition." And again: "It is a melancholy consideration for any humane and thoughtful mind to notice the numerous nostra which are offered daily for the alleged cure of this distressing symptom; those recommending them being reckless, and perhaps ignorant of the injury

Sounds in the ear.

* Harvey.

which may thus be inflicted on this very delicate organ by their use."

This affection is not to be cured by external and local applications, but principally, and almost exclusively, by constitutional remedies. Says our author again: "Trifling with and irritating the organ with drops, unguents, and lotions, is only betraying the patient into a flattering and useless anticipation of benefit, without any chance of eradicating, or even reaching, the root of the disease. In the treatment of this malady, our object ought to be, not merely to remove it, but to do so at as little expense as possible to the stamina of the body." Quackery.

I have alluded to that form of disease which occurs in consequence of exposure to cold and humidity, to vicissitudes of temperature, to currents of air to which persons are exposed in the windows of cars and carriages, and is oftenest met with in persons who have a predisposition to rheumatism, mainly because it is so often the subject of quackery, and the cause of loss of hearing. It is easy to make a deaf person feel that he is benefited for the time being, by almost any sort Rheumatic disease.

of manipulation about the ear. The temporary character of this improvement is only discovered after the mercenary man has received his fee. This disease, like many other diseases of the ear, and indeed also of the whole body, is frequently dependent upon antecedent constitutional infirmity; or may be owing to habits which have been gradually undermining the nervous energy of the system. Still, the patient will persist in regarding the attack as entirely a thing of to-day. Bad habits—for example, indulgence in intoxicating drinks, in tobacco, or habitual exposures—are often borne with apparent impunity, up to a point of time, when, on account of excess or diminution, or the development of hereditary predisposition, or the weight of years, the encroachment of disease may become palpable.

Bad Habits.

Gradual encroachments of disease, with or without an assignable cause, are not generally appreciated; and there is ever a popular reliance upon local rather than upon general treatment. This is happily alluded to by an American author.*

* Doctor W. Hooker, in his admirable work, "Physician and Patient."

"The physician often finds, on making his call upon a patient, that although he may think that his attack is only a thing of to-day, there is evidence that disease must have been preying upon his system for some length of time, gradually extending its ravages, till, at length, it has made a palpable outbreak; the patient may attribute his sickness to some one cause, but there have been many causes uniting together, one after another, and swelling the still current of disease, which has now broken forth as a flood, and as a general rule, the longer this preparation has been going on, the more obstinate does the physician expect the cure will be, and the more difficulty does he find in getting a definite knowledge of the nature and extent of the malady; and if he could always trace every train of disease up to all its sources, both original and ex-tributary, he would often be obliged to go back weeks and months, and sometimes years. Hooker.

"In some cases, such an explanation would lead through almost endless labyrinths. As it is, he often finds, in attempting such a search, that those facts which are the least material in the eyes of the patient, and what might be overlooked by him in

giving the history of his case, reveal, far back in the distance, causes which have had more influence than any other in producing this result. A sort of cross-questioning, and that, sometimes, of a rigid character, is often needed to develop material facts. The patient's own story, without such questioning, would generally give to the physician very erroneous ideas of his case. The remarks that I have made apply with greater force to chronic, than they do to acute diseases. For, in them more especially, as you have already seen, does the sympathy which exists between the different organs extend and complicate the morbid condition, and the operation of unseen causes contributes, sometimes very largely, to this result.

Chronic cases—how treated.

"Many chronic cases become exceedingly complex, and therefore obstinate, from the course which the patient takes with himself before he comes under regular and systematic treatment. Perhaps, first, he goes through with domestic medication, and then takes patent medicines, recommended to him by kind neighbors, or blazoned forth in the newspaper; then, he tries some vaunted system—Thomsonian, or hydropathy, or chrono-

thermalism—or, perhaps, all of them in succession. After going through all of this, unless some one of these measures *chance* to benefit his case—as *anything* may *chance* to do it—he at last comes to a physician, and puts himself under his care. The case, which was, perhaps, sufficiently complicated in the beginning to require strict investigation, is now rendered, by all this variety of practice, very intricate. The difficulty in understanding it lies in the varied effects which the different agents brought to bear on it, have produced—effects which, in the retrospect, it is almost impossible to estimate with any correctness, because the physician has only the history given him by the patient, and the appearance of his present symptoms, to guide him in making up his opinion. If he had himself seen the case, in its untouched condition, and then had witnessed the operation of the different remedies, he would have been better able to arrive at satisfactory conclusions. A chronic case, in its best estate, needs to be watched for some little time, in order to acquire a just and thorough knowledge of its character; and when it has gone through a series of processes at *hap-hazard*, with no intelligent eye to observe

it, it is no wonder that its condition should become a complicated and puzzling one. The physician, with such a case before him, is situated very much as the chemist would be, into whose hands should be put a mixture which had been experimented on over and over again by different chemists, and by those, too, who were ignorant and bungling. You would not demand of him that he should arrive at once at definite results, in examining the composition of such a mixture, but would give him time to apply various tests to it; so it should not be expected of the physician that he should fully understand, at once, the case which has been dabbled with by ignorant experimenters, one after another; but time must be given him to watch *his* tests, that he may see them bring out to view its real character and condition."

Complications by bad treatment.

CHAPTER V.

DEAF DUMBNESS, AND EAR TRUMPETS.

"And sweetly o'er the darkest doom
There shines some lingering beam of gladness."

THE dumbness of mutes is the legitimate consequence of their deafness. When one can no longer hear himself speak, he loses necessarily the power of speech. In the midst of society they are alone—unable to communicate their thoughts, and incapable of hearing the voices of others. They are a prey to their own passions, and their forlorn condition presents especial claims upon the philanthropist. These claims, until the present age, have never been acknowledged. "It has remained for Christian benevolence to conceive the noble idea, and modern ingenuity to carry out the great work of developing the

Condition of the deaf mute.

faculties of the solitary mute, and of giving him a knowledge of good—of rendering him independent, and enlisting within him feelings and aspirations, that, but for the blessings of enlightenment, would have slept until awakened in another sphere of existence."

Their changed condition.

The energy, perseverance, and philanthropy of good men, who have patiently taught the ear to hear and the eye to see, deserves more than earthly reward. Now, the subject of this dreadful affliction, by the education which is afforded at these blessed institutions, may continue to enjoy intercourse with society, and occupy positions of profit and usefulness. The causes of this disease are the same as those which produce deafness of a lesser degree, when not congenital. Scarlet fever, measles, and small-pox, figure largely in the list of causes. Cases are found in every climate, and have existed in every age. In eastern Europe now, as amongst the ancient Egyptians, Hebrews, Greeks, and Romans, the deaf mute was regarded as deserving no more consideration than a brute, and they were employed in the basest and most degrading offices. Their cases were regarded as

Causes of the disease.

without the pale of sympathy or alleviation—as incapable of improvement or instruction.

Under the Roman code they labored under legal disabilities with respect to property. The forms and complications of muteism are precisely similar to those which existed in Judea nineteen hundred years ago, when our Saviour performed the miracle of which it is said, "His ears were opened, and the string of his tongue was loosed, and he spake plain." In 1576, Jerome Carden, of Pavia, in Italy, expressed a belief in the possibility of instructing the deaf and dumb, and also the blind. The first systematic attempt to instruct the deaf and dumb was made about the middle of the sixteenth century, by Petro de Ponce, a Benedictine monk. Previous to this time, however, all intelligent deaf and dumb persons were acquainted with certain arbitrary signs, by which they could express their meaning to those accustomed to them; but until the time of De Ponce they were not regarded as susceptible of education. However, Pliny tells us of Quintus Pedicus, a relation of Cæsar Augustus, who, though mute from birth, attained great proficiency in painting, and in the middle of the sixteenth cen-

History of their education.

tury an artist flourished, upon whose tomb was written the following epitaph: "Heaven denied him the gift of speech, that he might give greater life and eloquence to the works of his pencil. As he could not speak himself, he made them speak for him." After the death of De Ponce, the instruction of the deaf and dumb continued to improve in Spain, mostly under the teaching of ecclesiastics, for the next two centuries. The publications of those who succeeded him, attracted the attention of philanthropists and scholars in Germany, Holland, France, and England; so that up to the eighteenth century astonishing improvement had taken place in the manner of teaching, and very great success was attained. The last thirty years has presented a new and advanced era in the history of teaching deaf mutes. In the success thus accomplished, our country has borne a distinguished part. A treatise, which is spoken of as valuable, appeared in this country, as early as 1793. In 1807, the deaf and dumb daughter of Dr. Cogswell, of Hartford, attracted the attention and enlisted the sympathies of the late Rev. Thomas H. Gallaudet, a man distinguished for scholarship,

Origin of the present system of education.

assiduity, and philanthropy. He went to Europe and spent some time to obtain instruction, and returning, opened his institution in 1817. His soon became a model institution, and led to the erection of large and flourishing "asylums" in many of our large cities. A deaf and dumb literature has sprung up, and periodicals are published, devoted exclusively to this class; and deaf mutes are found occupying elevated positions in society.

Thos. H. Gallaudet.

It would appear that the number of deaf mutes in Europe is one to fifteen hundred and ninety-three. It is said that there are very few in China. In Great Britain there is about one to every fifteen hundred; in the United States, about one to every two thousand. In Tuscany, Bavaria, Belgium, and Holland, there are fewest, being one to every two thousand two hundred and nine, while Sardinia and Norway exhibit the greatest, having one in every six hundred and forty-one. In some of the Swiss cantons, in localities remarkable for *goître*, or idiotcy, the proportion is as high as one to two hundred and six.

It is impossible to determine congenital deafness at a very early age. The relatives and attendants

of the child are so unwilling to admit the fact of congenital defect, that they usually manage to deceive themselves; and they most always confidently state that the child had been very well until it was twelve or fifteen months old. After strict inquiry, the reasons for forming these conclusions will often be found untenable. Physiologists have not decided at what age an infant first hears. Taste seems to be first developed. The first muscular action of the infant is that of the pressure of the hand against the nurse's breast, but this period is very variable. Vision seems to be perfect at birth, for before it is nursed, it is attracted by the fire-light, or candle. It will recognize its nurse from six weeks to two months. About the fourth month it will exhibit an appreciation of particular sounds, such as chirruping, whistling; but not till about the sixth month can an opinion be formed as regards the hearing of an infant. It is not usually until after the twelfth month, unless attention has been called to the subject, that the friends or attendants begin to perceive that the child does not hear. In the present state of the science, this disease must be regarded as incurable. All that

Difficulty of determining the disease at an early age.

can be accomplished for the subject of this infirmity is by resort to those means which modern science and philanthropy has discovered and perfected for their education.

HEARING TRUMPETS.

Hearing trumpets are contrived very ingeniously, and furnish material assistance in certain forms of deafness. The ordinary instrument, which must be large in order to collect sufficient sound, is objected to by patients because it is so conspicuous. If persons can hear what is said to them in a plain, distinct voice, not pitched too high, they are advised not to use the ear-trumpet. There is probably no instrument invented that will enable deaf persons to hear well in a public assembly.

Open trumpets.

Their use not advised.

Mr. George Tieman, No. 63 Chatham-street, New York, has lately brought out a style of article which has certainly the merit of compactness. Acoustic chairs have been invented, arranged with an apparatus for collect-

Acoustic chairs.

ing and transmitting sounds, for conversational purposes. A flexible tube, with an ivory mouth-piece at one end, and at the other a small ferule, which fits into the ear, answers a good purpose for whispering; but for conversation generally, an open-mouthed trumpet, or one that opens into a bell-shaped conch, such as is known among instrument-makers as Miss Martineau's trumpet, answers a better purpose, because it enables a deaf person to engage in general conversation. None of the more modern and less unsightly instruments are found, after all, to answer as good a purpose. There are, however, cases which are sufficiently relieved by these varieties—many of which are found in the shops—which can be concealed under the hair.* The silver tubes which are sometimes introduced, are seldom of any service. They are sometimes useful when an artificial drum is necessary, in order more perfectly to conduct the sound.

Conversation tubes.

* Benjamin Pike & Sons, and others, keep a full assortment.

CHAPTER VI.

"Oh, loss of sight, of thee I most complain."

COMPARATIVE VALUE OF SIGHT AND HEARING.

Comparative value of sight and hearing.

If inquired of, which sense would be selected, if sight or hearing must be parted with, most persons would answer hastily: "Give me my eyes, consign me not to an eternal night!" But surely the thinking mind would require time for consideration, before plunging into the condition of everlasting silence. It is certain that the blind obtain far more sympathy in this world than the deaf; and it is not certain but they less deserve it. Let us summon two witnesses on this point; one from eternal night, the other from the land of silence.

Says a celebrated blind orator,* "I have never

* Rev. W. H. Milburn's lecture, "Songs of the Night; or, Triumphs of Genius over Blindness."

known a morbid, morose blind man."

Milburn.

He regards the condition of blindness much less unfavorable to the development of intellect, than that of total deafness.

One of the few that have obtained celebrity among the deaf, and one of the most celebrated, thus remarks:* "Almost every one, whose acquaintance is extensive, will know several blind men of high talent and acquirement, and eminent in science and literature; but among the deaf, he will not know one so distinguished. In fact, one may tax his memory in vain for the name of a single deaf person of any note in past or present times, while the names of a host of blind men, distinguished in every branch of knowledge—not even excepting optics—rush to the mind in the effort of recollection."

Kitto.

Says a blind author:† "In the pursuit of knowledge, the blind have been very successful, and many of them have acquired the first literary honors which their own or foreign universities could bestow. In the different branches of philosophy, if they have not excelled, they have been equal to any of their

James Wilson.

* Kitto, "Lost Senses." † James Wilson.

contemporaries, but more particularly in the science of mathematics; many of them have been able to solve the most abstruse problems in algebra. In poetry they have been equally distinguished. Two of the greatest men that ever courted the muses labored under the deprivation of sight: Homer, the venerable father of epic poetry; and the inimitable author of 'Paradise Lost.' In philosophy, Saunderson and Euler appear in the most conspicuous point of view: the former lost his sight when only twelve months old, but was enabled by the strength of his comprehensive genius to delineate the phenomena of the rainbow, with all the variegated beauty of colors, and to clear up several dark and mysterious passages which appeared in Newton's 'Principia;' and, although the latter did not lose his sight till he had arrived at the years of manhood, yet, from that period he was able to astonish the world by his labors in the rich fields of science, where he earned those laurels which still continue to flourish in unfaded bloom. In mechanics, the blind have gone to a considerable length, almost to surpass the bounds of credibility, were the facts not

Homer.

Milton.

Saunderson and Euler.

supported by evidence of unquestionable authority.

Blind architects.

"Here, we find architects building bridges, drawing plans of new roads, and executing them to the satisfaction of the commissioners. These roads are still to be seen through the counties of York and Lancaster, where they have been carried through the most difficult parts of the county, once bogs and mountains. Indeed there are few branches of mechanics in which the blind have not excelled."

Several eminent travellers have been totally blind.

Lieut. Holman.

Lieutenant Holman completed a journey round the world. He wrote very creditable accounts of his journeys, which were published in four octavo volumes in 1834. He could pack his wardrobe, ride on horseback, chase the elephant—and of this, he once says: "Being left masters of the field, we anxiously advanced to examine the spoil, which proved to be a female elephant of extraordinary size. I climbed upon the carcass, where I stood and danced in triumph." We find our traveller climbing the highest peak of the Himalayas, *to enjoy the view.* In his journeyings by sea, he was accustomed to climb

to the mast-head, for the purpose of exercise. There are several other names of blind persons who have distinguished themselves as travellers.

Musicians and poets, the world has ever furnished from among the ranks of the blind. Prominent among these is Homer, the name being derived from the fact that he was a blind stroller, or wandering minstrel; and no less prominent was Milton, the English bard. The one was born nine hundred and forty-seven years B. C., and the other one thousand six hundred years after. Between them, many have flourished, less distinguished in poetry and music. The names of many divines, philosophers, and mechanics could be given, who have worked their way to distinction despite their great infirmity. It is said there are about eighteen thousand blind persons in Great Britain alone; and, probably, not less than eight hundred and fifty thousand blind persons are mingled with the population of the world. The modern improvements for the education of this unhappy class, serve to comfort and render useful many who would otherwise encumber society. The blind are usually happy—the deaf never. Says Kitto: "Strangers to all that passes

Blind musicians.

around them, the deaf mutes who see everything, enjoy nothing." Like Tantalus, whom the fable represents to us devoured by unextinguishable thirst in the midst of water, they are continually subjected to cruel privations. An insurmountable barrier separates them from the rest of men; they are alone in the midst of us, unless we know that artificial language which the talent and charity of their ingenious teacher have created for them. The custom which they have of reading the physiognomy is very often a subject of ever additional anxiety to them; they do not always divine aright; doubt and uncertainty increase their anxiety and suspicions; a serious cast, which resembles sadness, then invades their countenance, and proves that with us they are in their state of real privation. Obliged to concentrate themselves within themselves, the activity of their imagination is thus greatly augmented; and as attention and judgment follow necessarily the perception of ideas, they exhaust themselves immensely. Therefore one sees few deaf-mutes in the lists of longevity, because the functions are too lively, and to use an expression, common but exact, "the sword wears away the scabbard."

Deaf and dumb.

"More favored than those melancholy children of silence, the blind enjoy all the means of conversation with other men; no obstacle hinders them from hearing or being heard, since the ear, which has been so philosophically defined as the vestibule of the soul, is always open for them."

The sensations of one noble Christian, who was lately called to part with the priceless enjoyment of seeing, are thus graphically described in the following extract from a letter dictated by Professor A. Richardson of Freehold, N. J., which appeared in one of the papers* soon after an unfortunate accident had deprived him instantly of sight. He alluded to his loss in the death of a beloved child, and thus remarks:

"But now I have been called to part with all on earth—all, however dear, have vanished from my sight; the earth and the sky are gone; light and beauty have given place to darkness; even my own form has perished from my sight. The sun no longer rises and sets. Perpetual night reigns, but a starless night. I *feel* the breath of heaven as it passes by; I hear its mournful music;

Richardson.

* New York Observer.

indeed I live alone in a world of sound. Death seems to have begun its work, and left it half finished. The darkness of the grave surrounds me, the forms of loved ones have vanished, but their voices still sound in my ears. Time is at an end, and there is no longer succession of days—the next light I am to behold will be that of the eternal world—the next morning that bursts upon my vision, that of the Resurrection. But this is a welcome thought. My mind runs forward and anticipates with joy the scenes next to open upon my sight. When my spirit sinks within me as I think of what I have lost in this world, then I find an unfailing source of consolation in anticipating the light, the joy, the friends of our earlier days who have gone before us to Heaven. Though cast down, I am not in despair. I hope to labor in the field where the providence of God seems to have placed me."

I doubt not that he will continue still to accomplish much. So much talent and such glowing piety, society can ill afford to spare. The Professor has only joined the host of noble men, who, though blind, have made their mark permanently upon the generation through which they passed.

As a further illustration of the truth that the

effectiveness and happiness of the blind are less influenced by their infirmity than the deaf, I will introduce another single quotation.

In Milton's second defence of the people of England may be found this passage in allusion to his loss of sight: "Let me then be the most feeble creature alive, so long as that feebleness serves to invigorate the energies of my rational and immortal spirit. As long as in that obscurity in which I am enveloped, the Light of the Divine Presence more clearly shines. Then in proportion as I am weak, I shall be invincibly strong. In proportion as I am blind I shall more clearly see. Oh, that I may thus be perfected by feebleness and irradiated by obscurity. The Divine law shields me from injury by the overshadowing of those heavenly wings which seems to have occasioned this obscurity, and which when occasioned is wont to illuminate with an interior light more precious and more pure." Milton.

The following lines by an American authoress are published in an Oxford edition of Milton, as one of the effusions of that master of English song. Though not Milton's, it is a beautiful paraphrase of his language.

"I am old and blind!
Men point to me as smitten by God's frown;
Afflicted, and deserted of my kind,
Yet I am not cast down.

"I am weak, yet strong—
I murmur not that I no longer see—
Poor, old and helpless, I the more belong,
Father Supreme, to thee!

"Thy glorious face
Is leaning toward me, and its whole delight
Shines in upon my lonely dwelling place,
And there is no more night.

"On my bended knee
I recognize thy purpose, clearly shown;
My vision Thou hast dimmed that I may see
Thyself, Thyself alone.

"I have nought to fear!
This darkness is the shadow of thy wing—
Beneath it, I am almost sacred—here,
Can come no evil thing.

"Oh, I seem to stand
Trembling, where foot of mortal ne'er hath been,
Wrapped in the radiance of thy sinless land
Which eye hath never seen.

"Visions come and go—
Shapes of resplendent beauties round me throng,
From Angel lips I seem to hear the flow
Of soft and holy song.

"In a purer clime,
My being filled with rapture—waves of thought,
Roll in upon my spirit—strains sublime
Break o'er me unsought.

"Give me now my lyre!
I feel the stirrings of a gift Divine;
Within my bosom glows unearthly fire,
Lit by no skill of mine."

History has preserved accounts of many blind persons who acquired great knowledge, before there existed any regular method of instruction applicable to their case.

They were considerable in the times of the ancient Romans. Diogenes Laertius relates that several philosophers voluntarily deprived themselves of sight, in order to pursue their contemplation with less interruption. Diodatus Cicero, master in philosophy, applied himself to study with more assiduity than ever, after he had lost his sight, and *taught geometry* with very great precision. Cornelius, a Roman citizen, who lost his sight in his youth, distinguished himself in elegant literature. Eusebius the Asiatic, blind from five years of age, acquired vast knowledge, and taught with the utmost facility. A long list of distinguished blind men flourished about the same period—among them

were mathematicians and philosophers and voluminous writers. Nicaise flourished in the 15th century: "although blind from three years of age, he made great advances in science, and taught publicly in the university of Cologne, citing from memory long passages that he had never seen." James Schegkins taught philosophy and medicine with great success. John Fernand "surmounted the obstacles both of blindness and poverty, and became a poet, logician, philosopher and musician." It would too much extend this subject, to speak at length of one who became a fine belle-lettres scholar in the 17th century; of another who became a voluminous author; of another who became Professor of Mathematics, at Cambridge; of Huber, who composed the best treatise extant on bees and ants. Indeed, there is no branch of science or art, in which, in some age, the blind have not acquired distinction. A young blind cabinet-maker in Germany made pepper-mills with his penknife; another was a fine chess-player, and could shoot an arrow from a bow with very great precision. He went abroad without an attendant, and ate at the table so dexterously that a stranger could not discover that he was blind. A blind butcher could

estimate accurately the weight of the animal he was about to kill. Several have been eminently skilled in statuary and designing.

There seems in truth to be a sort of compensating power, alike subtle in its resources and refined in its operation, by which a multitude of latent faculties and unheeded perceptions are called into activity, to supply the want of one great inlet of knowledge, and which, taken in the aggregate, and fully developed, appear almost sufficient to fill up the blank which has been left by nature or produced by disease. "There are few things practicable by persons possessed of sight which have not been done by those who want it; while with regard to several, the balance of advantage is clearly in favor of the blind.*

REVELATIONS FROM THE LAND OF SILENCE.

Rev. John Kitto, D.D., who lost entirely the sense of hearing at the age of twelve years, in consequence of a fall from a house-top, furnishes some

* "Encyclopædia Britannica."

very interesting facts in relation to this subject. So few among the deaf have ever been able to note their experiences, that this record is as rare as it is interesting. Dr. Kitto has obtained considerable celebrity as a theological writer. In that division of his "Lost Senses" devoted to the subject of deafness, he gives us a view of the interior life of the inhabitants of the land of silence. The picture is graphic and interesting. It will induce in the reader feelings of devout gratitude for the possession of the sense, and he will rise from the book with the impression that if he must lose the sense of hearing or seeing, he would even prefer the latter.

Kitto.

Says our author: "Any one who has spent a considerable portion of time, under peculiar, or, at least, undescribed, circumstances, must have been very unobservant, if he has nothing to relate in which the public would be interested." He speaks of his deafness as "the most intense deafness to which any living creature could be subjected."

He says, with regard to speech, though speaking caused no physical pain, "I felt the strongest possible indisposition to use my vocal organs." He seemed to labor under a "moral disability, to

overcome which, long training and the severest effort of the will were required." It was a considerable time before he could speak understandingly, having no ear to direct the modulations of the voice. He says, "few persons speak in my presence, concerning whose voice I do not receive a very distinct impression." He says that by watching the mouth of the speaker, he can often gather many sentences, but thinks that "even a limited degree of facility in mouth-reading can only be acquired by sedulous and long-continued attention." "The loudest thunder," remarks our author, "is perfectly inaudible to me, as well as the sound of bells." Placed in contact with the bell-tower, he was conscious of a distinct impression. Guns fired very near produced the impression of a heavy blow upon the head with the fist, covered with a boxing-glove.

The drawing of furniture and shutting of doors distressed him more, he thinks, than if in full possession of his hearing. "The lightest footfall upon the same floor will rouse me even from sleep." The running of a child against his study-chair produced a very "painful sensation." He thinks it untrue that "the loss of one sense is compensated by

Effects of sounds.

the extraordinary development of the other," in the case of the deaf, with regard to the sense of sight. Our author had, as would be expected, great fondness for pictures. He was a very acute physiognomist, readily determining the character and passing sentiments of persons, from the countenance. He had great dread of darkness, because it shut out the only method of communication with the external world. The power of minute observation with regard to external objects, he found to be very greatly developed, as would be expected.

When the terrible disqualifications of the deaf are considered, it is not a wonder that so few have risen above the moral isolation in which they are placed, but that any should have ever struggled forth into the light of the outer world, and risen to a position of eminence and usefulness. It can only be accomplished, as says our author—and he is a bright example—"by the exercise of great energies, unbounded hope, and unusual force of character." He proceeds: "Take a glance over the occupations by which men live and thrive, and see how few there are for which the condition to which I was reduced would not operate as a serious disqualification." After having struggled on to emi-

nence, the accomplished scholar thus remarks: "Now that I am in fact, another being, having but slight connection, excepting in so far as 'the child is father to the man,' with my former self; now that much has become a business which was then simply a joy; and now that I have gotten old in experiences, if not in years—it does somewhat move me to look back upon the poor and deaf boy, in his utter loneliness, devoting himself to objects in which none around him could sympathize, and to pursuits which none could ever understand." The views, feelings, motives, and emotions of this man, as expressed in detail, are full of interest as he went on distinguishing himself, and making a permanent mark, "excluded from the advantages of those easy and incidental conversations, in which so much of the real business of the world is transacted."

Dr. Watson.

The early history of the "naturally deaf, and consequently, dumb," is thus graphically depicted by Dr. Watson: "The first five or six months of his existence are not distinguished by any perceptible deficiency; he is not less attentive to the smiles and visible caresses of his parent or nurse, than

another would be; but when that period arrives at which words usually begin to make some impression, and a few responsive syllables of the most obvious formation begin to gratify a parent's ear, he remains mute and insensible to the most moving accents. Still hope finds a thousand excuses; and though doubts and fears may arise, yet are they reluctantly entertained in the parental breast till time has slipped away with a year or two of infancy; and then it is gradually discovered that when a want is to be made known, or an approval or aversion expressed, it is done by a motion of the head, hand, or countenance. In place of the loquacious and engaging prattle usual at his age, with him there is silence or only inarticulate sound. At times he is pensive and cheerless, no doubt feeling the disappointments necessarily frequently resulting from incapacity to make himself fully understood by those about him, who possessing a more perfect medium of mental intercourse, are too apt to be inattentive to the signs and gestures of the little *mute*. Discouraged by his frequent fruitless attempts to make himself understood, and to understand, ought we to wonder if the temper of a deaf and dumb person should be soured—if he should

be rendered little communicative of the few ideas furnished by his own imagination, and still less inquisitive about the ideas furnished by the observation of others?

"Having had no means of making known his wants and inclinations, or of knowing the things intended for his information by others, his attention will naturally be turned to the interpretation of *visible appearances.* The least alteration of the countenance, a slight motion of the hand or head, will be understood by him, if it does but indicate, in a natural manner, approbation, disapprobation, &c. Thus, when any person, thing, or matter, is beheld with a bright or smiling countenance, he immediately interprets approval; the reverse, if he discerns the countenance darkened by a frown while the eyes are directed to any object. Do you require him to approach you? make the sign of the hand drawn towards you; to go from you—reverse the sign, and he instantly obeys. Do you require him to eat imperatively? put your hand to your mouth, making the jaws to move as if in the act of mastication, keeping the countenance intense and steady; he will comprehend and obey, or refuse with a significant sign. Suppose you wish to put

the question whether he be inclined to eat—you need only make the same signs of the hand and mouth, and instead of the stern steadiness of command in the countenance, let it bear an indication of inquiry. By the same signs, with an appearance of anxiety of mind, concern on the countenance, you may entreat him to eat; and so on in other things, such as drinking, sleeping, walking, running, &c.

"It is in this simple manner that deaf and dumb persons are enabled to hold converse with each other, though brought together for the first time from the most distant parts. Thus far the signs may be termed *natural;* but the naturally deaf do not stop here with language of pantomime. When several are together, it is astonishing what approaches they will make towards the construction of an artificial language. By an arbitrary sign, fixed by common consent, or accidentally hit upon, they will designate a person or thing by that sign; which from henceforth is used by them for a proper name. It is remarkable that although in the first instance of inventing and applying these sign-names, they are generally guided by some prominent, but, perhaps, by no means permanently characteristic

mark, such as a peculiar article of dress, an accidental wound, though it leave no scar, &c. Yet, after having fixed, they never vary, notwithstanding the distinction which may have guided their choice should have long ceased to be observable about the person of the individual to be designated. *Nor will they fix upon the same sign for another acquaintance, though at the first meeting he may have the very same mark of distinction about him which they had used* to designate a former person.

"For example, suppose a person, the first time he is particularly taken notice of, by one who is deaf and dumb, had accidentally cut his face, and wore a patch; that would be likely to become his distinguishing mark, unless some one of the deaf person's acquaintance had been already so distinguished. The wound had been cured, and the patch removed, but the deaf person would uniformly put the end of his finger to that part of the person's face where the patch had been worn, when he wanted to point him out; and lest those to whom he might be afterwards desirous of communicating something concerning this person, should not comprehend him, he will not fail to introduce

him to them by repeatedly pointing to him, and then to the mark by which he meant to describe him. By similar contrivances, places and things are distinguished by the deaf in an astonishing manner."

There are said to be several Indian tribes in the far northwest of America, who carry on among themselves a brisk trade, communicating wholly by signs. Many of their natural signs are said to be materially the same as those employed in the schools for the deaf and dumb. To the celebrated Abbé de l'Epée and Abbé Sicard, the deaf are mainly indebted for the system of communication by which they so rapidly talk, making the fingers serve the purpose of a tongue. Laurent Clerc, one of the pupils of Sicard, has acquired at the institution at Hartford, Conn., a celebrity scarcely less than his French preceptor.

The impressions of Dr. Kitto in his maturity are full of interest—his craving once more to hear the human voice—how his temper became "more cheerful than melancholy, more sanguine than despondent when enabled to realize the consciousness that he came to the feast of life as an invited guest, not as a beggar; because his soli-

tary studies had made him feel that his life had been useful"—his pleasure in the realization of the embodied presence of great men, and *seeing* them speak, and his difficulty in finding anything in the printed reports "adequate to the applause which they had excited."

The blind have a perfect mastery of words, and their sole reliance upon the ear as the vehicle of pleasurable sensations, renders them exquisitely alive to harmonious sounds and numbers; on the other hand, the deaf man wants words, and has *no ear* for numbers; it is, therefore, almost impossible that he should have the knowledge of quantity and rhyme, which is essential to harmonious verse. In this manner Dr. Kitto accounts for the fact that the deaf seldom attempt versification, while the blind have so eminently excelled in music and poetry. He gives some examples of his attempts in the domain of poesy, and they excite wonder that he could have come so near success. Dr. Kitto was, it must be remembered, not naturally deaf. He knew the value of sounds, and lived, till twelve years of age, in the full enjoyment of the sense of hearing. Of the naturally deaf, very few have distinguished themselves, and

of the accidentally deaf, few, very few, have equalled the learned author whose experience I have referred to.

While the works of the blind would fill a very extensive library, those of the deaf could be printed in a few volumes.

Massieu, a pupil of Abbé Sicard, was a prodigy. At ten years of age, he cried to be taught, as he says, "not from the most distant conception of what reading and writing really were, but from a vague feeling that there was some unknown privilege and enjoyment in the matter, from which I ought not to be excluded." His parents told him there was no remedy. He ran away from home, and went to school, and, on his knees, weepingly begged instruction. The teacher rudely drove him away. Providentially, a gentleman knew him, who put him under the care of Abbé Sicard. Of his improvement, he says, "In the space of many days, I knew how to write some words; in the space of three months, I knew how to write many words; in the space of six months, I knew how to write phrases; in the space of a year, I wrote well; in the space of a year and nine months, I wrote better, and I answered well to questions that were

proposed to me. In the space of four years, I became like the *extendans-parlans*."

Massieu was frequently visited by distinguished men, and the answers that he made to their inquiries are full of interest, as revealing the impressions of a fine mind, which knew nothing of sound.

Beethoven, the prince of musical composers, was wholly deaf during the latter part of his life; and notwithstanding, composed some very excellent pieces of music, of which of course he never heard a note. He always carried a small paper book with him, and carried on his conversation in writing. In this book he jotted down any musical idea that occurred to him. Says a writer of him, "The moment he is seated at the piano, he is evidently unconscious that there is anything in existence but himself and his instrument; and considering how very deaf he is, it seems impossible that he should hear all the plays. Accordingly, when playing very *piano*, he often does not bring out a single note. He hears it himself in the 'mind's ear.' While his eye and the almost imperceptible motion of his fingers, show

Composed while deaf.

Talked with his pen.

His method of composing.

that he is following out the strain through all its dying gradations, the instrument is actually as dumb as the musician is deaf." The total loss of hearing at length deprived him of all the pleasure which society could give. He used to frequent a particular beer-house, and sit moodily in the corner, drinking wine and beer, eating cheese and red herrings, and studying the newspapers. On one occasion, a stranger sat nigh him, whose appearance he did not like; it is said, "He looked hard at the stranger and spat on the floor, as if he had seen a toad; then glanced at the newspaper—then again at the intruder, and spat again; his hair, which had not been visited for years with a comb or scissors, gradually bristled into more shaggy ferocity, till he closed the alternative of spitting and staring, by finally exclaiming, 'What a scoundrelly phiz!' and rushed out of the room." Among even his oldest friends he was humored like a wayward child. He died in great poverty.

His ill-temper.

The following answers from Massieu show that the idea of sound is analogous to that which the blind form of sight:

Massieu.

"Before your instruction, what did you think

that people were doing when they looked at each other and moved their lips?"

"I thought they were expressing ideas."

"Why did you think so?"

"Because I recollected that some one had spoken of me to my father, and he had threatened to have me punished."

"You thought, then, that the motion of the lips was our way of communicating ideas?"

"Yes."

"Why, then, did you not move your lips to communicate yours?

"Because I had not sufficiently watched the lips of the speakers when they spoke, and because people told me my voice was bad."

"Did you know what it was to hear?"

"Yes."

"How had you learned that?"

"A hearing female relative, who lived at our house, told me that *she saw with her ears a person whom she could not see with her eyes.*

Again, on another subject:

"What were you thinking about, while your father made you remain on your knees?"

"About the heavens."

"With what view did you address to it a prayer?"

"To make it descend at night to the earth, in order that the plants, which I had planted, might grow, and that the sick might be restored to health."

From the constant references of people *upwards* in worship, he conceived a vague idea of a Ruling Power in the body of the heavens. The statue of an old man with a beard in the church, he thought, lived above the sun. He thought that cattle sprung out of the ground, and often watched to see the heavens descend for the growth of things. All this before he came under the instruction of Abbé Sicard. He feared, when the Abbé taught him to write the name of God on the black-board, because he thought God caused death, which he defined to be "the cessation of motion, of sensation of chewing, of the softness of the skin, and of the flesh."

He says in answer to a question, "I thought there was a heavenly land, and that the body was eternal." The immortality of the soul he could not then be made to apprehend.

Says Charlotte Elizabeth, "Nothing appears to occasion such distressing perplexity to a deaf mute, as the death and burial of his fellow-creatures. The change produced on countenances which used

to smile on him—the icy coldness and total insensibilities of the frames; the act of screwing down a coffin lid over them, and of depositing that coffin beneath earth's surface, with the solemn act of worship accompanying it; all these are terrible and awfully exciting to him, especially when he is made to comprehend that he, too, must be enclosed in a long box, and deposited in a deep pit, far from the glow of cheerful light, and from all that now gladdens his solitary existence.

"I never beheld anything so striking as the avidity with which my poor John caught at the first intimation of a resurrection from the dead, and during more than seven years, there was scarcely a day on which he did not refer to it with delight."

The instruction of the deaf mute, doubtless reached the highest point to which it is capable, in the case of Massieu. The following are some of the replies of his full maturity:

"What is hope?"

"Hope is the blossom of happiness."

"What is the difference between hope and desire?"

"Desire is a tree in leaf, hope is a tree in blossom, enjoyment is a tree in fruit."

"What is gratitude?"

"Gratitude is the memory of the heart."

"What is time?"

"A line that has two ends—a path that begins in the cradle and ends in the tomb."

"What is eternity?"

"A day without yesterday or to-morrow; a line that has no end.

"What is God?"

"The necessary being—the sun of eternity—the mechanist of nature—the eye of justice—the watch-maker of the universe—the soul of the universe."

The acute and dangerous question—"Does God reason?" was put to him by Sir James Mackintosh. The answer was—

"Man reasons because he doubts; he deliberates, he decides. God is omniscient, he never doubts; he therefore never reasons.

This subject could be greatly extended. I have designed to furnish a glimpse of the interior life of the deaf, in order to exhibit the comparative value of the organs of sight and hearing, and the degree of disability which their loss occasions.

The authorities which I have referred to are accessible, and if the above extracts have awakened an interest in the mind of the reader, it will

be found an entertaining and profitable subject of inquiry.

Were it not foreign to my purpose, I could add a very interesting account of some human beings who have lived without senses, of whom it has been said, that the mind was locked up in a case, the key of which cannot be found!" The amount of instruction, of which persons have proved susceptible, who were deprived of both the senses of sight and hearing, almost surpassed belief. The well-known case of Laura Bridgeman, when we regard the amount of instruction which was accomplished, exceeds all others of which we have any record.

Loss of both senses.

Laura Bridgeman.

An entirely new case has been reported within a few months. The subject is Abby Dillingham, of Fall River, Mass. This is a case of disease produced by a fall at the age of eight years.

She is deaf, dumb, and blind, and has no use of her right hand, yet she will converse fluently with the mute alphabet, writes very legibly with her left hand, reads common writing, on a paper, or slate, or print (if the ink be not too much worn), by passing her fingers over the words.

She will also distinguish the different colors of a variegated dress, in the same way. She has wrought several pieces of crewel work that would be a credit to any girl of her age, selecting and arranging all the colors by feeling, and using only her left hand. She plays draughts and backgammon expertly. She knows when one comes into the room by the jar of the bed (on which she constantly lies), and can in this way distinguish the different members of the family.

A young lady, to test Abby's acuteness, entered the room with an unusual gait. She laughed out, and immediately imitated the long steps with her finger, and said "Sally"—the right name—(with her fingers, of course).

She is very sprightly and playful. Whenever she is removed, she goes into a fit.

She writes on a slate. The slate lies on her breast—she writes with her left hand, over the top of the slate, the lines running parallel with her body. She has been instructed by her own family. She has health and strength to aid in her intellectual efforts. It is not merely against the defects of sight, hearing, and speech that she labors, but

against fits, and the paralysis of one half her body.

The number of the blind exceeds that of the deaf. Formerly it was supposed that there were few deaf and dumb, but the discovery of methods of education have developed a large number.

Of the blind, there are in Great Britain twenty thousand. Forty-nine per cent. are over sixty years of age. Of the deaf and dumb, there are twenty thousand, of ages from five to twenty-five.

The number of deaf mutes in Europe are as one in fifteen hundred and ninety-three. In Great Britain, one in sixteen hundred and seventy, not including infants, with regard to whom the certainty is not ascertained.

In rural districts cases are more frequent than in towns.

They are oftener met with in hilly, than in flat, or valley districts.

In some of the Swiss cantons, where Cretins abound—these unfortunates are mostly deaf mutes —the proportion is one in two hundred and six. In the highlands of Scotland, one in one hundred

and fifty-six. The returns in the United States are defective. They report one in two thousand three hundred and sixty-six. The sexes, the world over, average about alike.

THE END.

NOTE A.

The following extracts from a recent number of Harper's Magazine, graphically describe and illustrate some of the interesting facts connected with the mechanism of the ear:

"The eye and the ear present to us a vastly more complicated physical apparatus than we find in the other senses, by whose aid the mere motion of the outer world is conveyed to the inner world of our being. Here no gross enjoyment is offered, as in taste; no firm, substantial shock is received as in touch; no actual absorption of minute particles here takes place as in smell. Mere gentle waves of the feeblest elements around us—of light, intangible air, strike the wondrous structure, and joy or sorrow, faith or fear, stir up the sea of passions and deep emotions that ever move restlessly within the breast of man.

* * * * * * * * *

"The ear of man is the most perfect of all, but the most difficult of access. Its wondrous parts are deeply hidden in the secrecy of our head, unapproachable during lifetime, and, dark and unknown, therefore, as yet, are their peculiar functions. The fleeting intangible nature of sound escapes all

observation; and means of comparison, also, with other organs of hearing are utterly wanting. We enter at first a wide well-oiled canal, whose tortuous windings, and stiff, stout hairs exclude all else, but light, invisible air. It is nearly an inch long, and carries the sounds onward, holding the waves, as it were, well together, and increasing their strength by reflection. * * * * * * * * *

"We enter next a round, well-stored chamber, filled with ever-renewed air, and deeply, snugly ensconced in the interior of the bones that form our temples. Safely protected without, it has a door within, and a tubular passage that leads right into the mouth, through which a current of air is ever passing into the curious little apartment. The curious and wonderful drum always remains well-stretched, whatever pressure may be brought to bear upon it by the impatient waves of air that constantly beat upon it from without. The tube, moreover, serves as a sounding board, adding new strength and greater distinctness to the sounds that enter the inner chamber. Therefore artillerists open the mouth at the firing of cannon, to escape deafness, permitting the sounds to find egress through this remarkable canal. * * * *

"The furniture of this little chamber consists of three mysterious bones, of oddish shape and unknown purpose. Their names resemble actual things. The hammer is closely fastened to the drum, and serves, besides other purposes, to stretch and relax it, according to the nature of the sounds it receives. A powerful muscle, beyond the control of all, but a favored few men, draws it back and releases it again;

thus varying the power of reverberation. It acts in this respect, exactly like the pupil of our eyes. * * *

"The inner secret chamber is a wonderful room, deep in the very heart of our head, set in the still solitude of rock-like bone which no ordinary knife can cut. This tiny room is filled with pure limpid water, and branches off on one side through double openings, into three wonderful archways; and, on the other, into the cochlea, which closely resembles the tortuous walks of a snail's peculiar house."

This author in a very happy manner, in conclusion, thus sums up the process of hearing: "A concussion without, moves the atmosphere, which rises and falls, like the waters of the ocean, in waves that spread to all sides until they meet with resistance. They enter the outward ear, pass through the outward channel, and strike against the first door, the drum. This delicate curtain moves under the pressure, and sets the three tiny bones into motion.

"The hammer pushes the anvil, the anvil pushes the stirrup, and the stirrup pressing with its lower end upon the closed door of the innermost chamber communicates thus the commotion to the water that fills the labyrinth. The liquid rising in miniature waves, which still correspond, it is said, with amazing accuracy to the airy waves without, touches, as it rises and falls, the delicate ends of the nerves, and this simple mechanical contact, spiritualized at the instant in which it passes from the nerves to the mind, is changed from a silent, lifeless undulation of air, into a living, sounding impression."

I trust the able author will pardon me a still further reference to this production, to which the attention of the reader is directed for many interesting suggestions on the subject. Alluding to quackery, he says, "If any body should venture to offer to the public an arcanum, a few drops of which poured into a watch would repair the broken wheel or the rusty chain, regulate its accuracy, and restore it to first perfection, would he not be received with sneers and scoffs, and reproached with a desire to insult our common sense? And yet we have seen, but of late, grave, honored physicians, who proclaimed aloud that they possessed the secret of a powder or an oil, a little tube to be put into the ear, or a magnet suspended behind it, that would cure, without doubt, all possible ills to which the ear is heir? Nothing but a melancholy indifference to the wonders of our own body, "made after His image," could produce such errors, and make us endure such announcements. We forget that "the hearing ear and the seeing eye, the Lord hath made even both of them."

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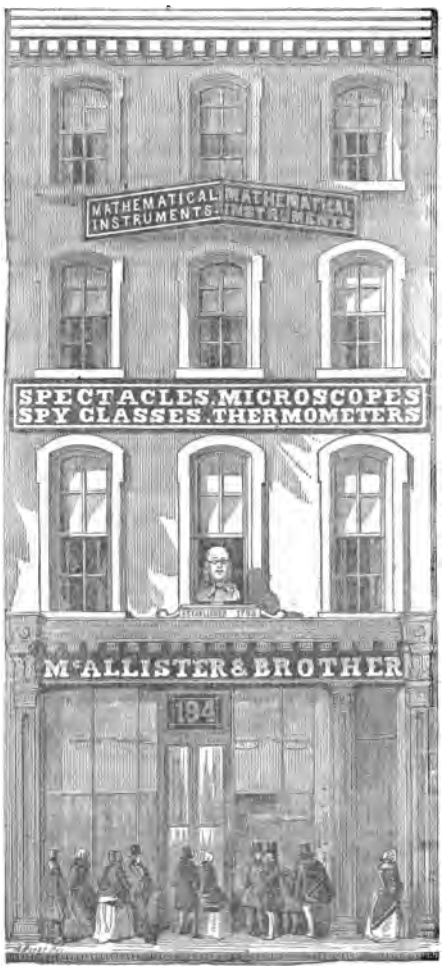

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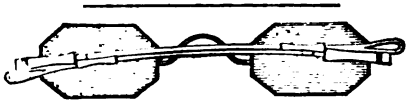

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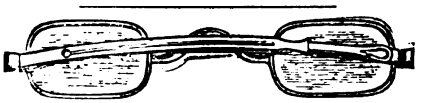

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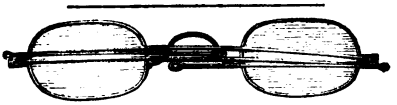

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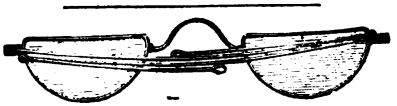

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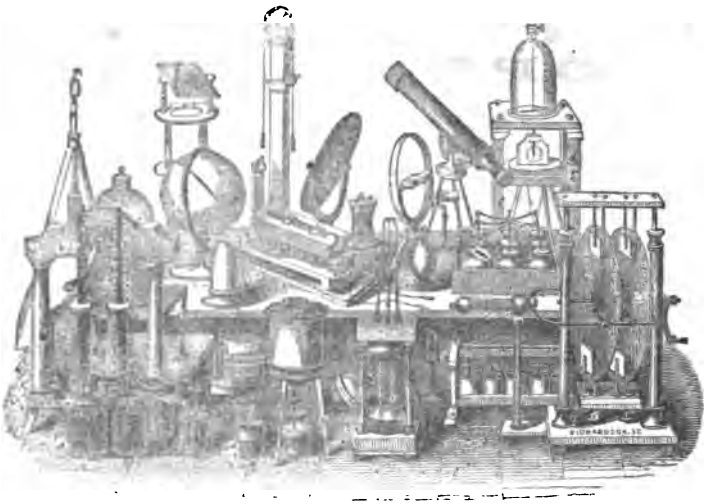

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